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OSWALD SCHLOCKOW, Associate

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. . . CLASS INSTRUCTION . . .

DECEMBER 1900.

Individual Versus Class Instruction,

By Oswald Schlockow, Instructor, New York City.

THE structure of the universe displays the principle of economy; whereby is avoided an expenditure of energy in excess of the amount required to accomplish the end in view. To secure this economy, the members of the universe co-operate to achieve the end of their existence with the least amount of effort; in this consists simplicity, plan, and order, and through it is secured harmony, or the combining of parts into consistent wholes. What is the theory of the conservation of energy, which teaches us that the heat emitted by the sun is not dissipated, only converted into other modes of motion—the highest generalization of science—but an exemplification of the simple law of economy—nature wastes none of her materials? Not only in physics however, but also in æsthetics, do we find the same law to hold true. Grace, one of the elements in works of art, reduced to its lowest terms, consists only of a correct mean between excess and insufficiency; in other words, the artist has accomplished the purpose in hand with just enough effort—has adhered to the principle of economy. And wherever economy is violated, progress towards a higher plane of existence will consist in a closer approximation towards this principle, for it is natural that every organism should seek to secure results with minimum exertion. *The line of least resistance is the path of progress.*

To secure the advantages of economy in school administration, it has been found necessary to combine individuals into groups, and to make these the units of instruction. So evident is the wisdom of this arrangement that we need not be surprised to find the plan adopted in very early times. Class division was made mandatory by the exigencies of the social environment, which did not permit the individual instruction of pupils. Mere promiscuous grouping, however, is found in the end to be wasteful; for reaping the full benefits of class instruction, certain conditions must exist.

1. To constitute an ideal class for the purposes of instruction, the individuals included should possess equal powers and abilities.

But perfect uniformity in intellectual, physical, and moral attainments is not to be looked for, and all practical classification must therefore seek only to approach this. Without proper grading the class is not the homogeneous mass through which economy in teaching can be secured. There must be something in common to the members of a class to which the teacher can appeal, or else both teacher and pupils will waste their energies; and yet we often find the same class to be an unwilling and therefore wasteful mingling of the extremes of intelligence.

2. Efficient class instruction depends upon the number of individuals that constitute the unit. Theoretically it makes no difference how many pupils are in one class, provided we have complied with the requirements of proper grading. In practice we find the teacher possessed of a limited amount of nervous energy, which if diffused over too many individuals will be productive of meagre results. It has been found economical therefore to limit the number of pupils in order to secure results commensurate with the amount of vital force expended by the instructor. The Monitorial System in which one teacher taught, say ten classes, has been found anything but economical. Authorities differ as to the proper maximum number of pupils in a class; it has been found, however, that forty are perhaps as many as the average teacher can handle efficiently.

3. Nor are these the only conditions to be observed if we wish to secure that economy which justifies the existence of classes. We must look at the material side of the problem, and consider the classroom itself, its ventilation, location, size, furniture, lighting, etc. Unless all these factors are looked after, the advantages of proper grading and even of a small number of pupils will be counterbalanced. But to treat of these matters would be to go beyond the confines of this article.

I have spoken of the relations of the principle of economy to my subject; but class instruction has a higher justification than the mere expediency of economy. The ideal education of a human being consists of the development of his peculiar talents under the conditions imposed by society. If it be true that without allowing for individual peculiarities we develop but a living automaton, yet if we do not consider the demands of the social whole, we produce a monster. Class instruction would hence still be a necessity, from the social or ethical point of view, even should it be found that individual instruction were practical under present conditions.

It may be profitable to stop here for a moment to look also at certain intellectual benefits accruing to the individual from his being taught in company with others of his own age and type.

Psychology teaches us that each individual accentuates some element of his field of vision, depending upon interest and attention. Many individuals placed together are thus able to select, from the contemplation of an object or problem, more elements than any one individual could, and this mutual help will correct the mental bias peculiar to every one. The teacher likewise should always be ready to make allowances for his own limited horizon, and should be ever on the alert to appropriate any discoveries made by the many pupils who handle the problem. Each individual discovery, before it can become available must be presented to the rest of the class, and this will necessitate oral expression, which is thereby apt to become more natural and spontaneous than if based on the mere reproduction of book learning.

It should also be remembered that a pupil may have a way of grasping and comprehending a problem which may be far more intelligible to the class than the explanation of the teacher. Pride often causes us to close our ears to the comments made by our pupils, because we may be self-satisfied with the lucidity of our own mental processes. We thereby overlook the fact that different minds are constituted differently and may reach the same result by an entirely different route. Do not many of us remember the ease with which we learned from our classmates, who after being so fortunate as to comprehend the explanation of the teacher, were also able to interpret and supplement this knowledge, so as to make it more suitable to our understanding? This mutual help comes to him who is educated with others in a class.

Further we find that when a certain number of individuals pursue the same end, there is developed an emotional factor—the feeling of social co-operation, which acts as a stimulus in the pursuit of an object. Imitation, the desire to accomplish what others have done, and the laudable ambition to excel, assert their sway in the class. The individually taught pupil becomes self-satisfied because no incentives are offered to excel himself.

But apart from these intellectual benefits we must consider the civic benefits derived from class instruction, and the social influence exerted on the pupils. It has become a commonplace to state that the school is a miniature community. As in public life, the child learns to respect the rights of others, and how to behave without infringing these; he also learns what his own rights are and demands for them a proper recognition. The sympathies of the child are also widened, as he finds a broader field for their healthful exercise.

The advantages gained by teaching collectively are, as has been pointed out, too important to be neglected; yet it must be acknowledged that there are some dangers to be avoided in class instruction. With a weak teacher the temptation is great to presuppose equal powers in all the pupils of the class and to teach accordingly. Such instruction, appealing to few of the members of the class, becomes monotonous to many, and monotony is a prolific source of disorder. To avoid this, the individual pupil must receive proper recognition, which is one of the chief points held in common by the great reformers. This demand, though suppressed time and again by custom and ignorance asserts its power, and to-day its truth is one of the axioms of educational practice. But the recognition of the individual implies the recognition of tendencies peculiar to each pupil, and this at first sight may appear incompatible with the grouping made necessary by class instruction, which is based on the proper subordination of the one to the many. Shall we then forego the advantages secured by the centripetal force of organization, or shall the centrifugal needs of the individual be made supreme? Or is there perhaps, as the harmonious elaboration of nature's worlds would lead us to suppose, a possible golden mean, a reconciliation of contradictories, in which each of these tendencies shall find its proper scope, and by supporting the other, help to form a whole more nearly perfect than either of the constituent elements? The chief aim of this article is to set forth the possibility of finding such a reconciliation.

A rapid survey of the advantages secured in an absolutely individualistic education as found in the family, may not here be out of place. It cannot be denied that the home can make greater allowances than the school may for individual peculiarities in mental power, temperament, and physical conditions. There is moreover a greater security from evil influences and a greater opportunity for the child to develop at a rate commensurate with his natural powers and abilities. There is less publicity and greater quiet in the family, and there are fewer distracting elements to contend with. In addition there are the advantages derived from a closer and more constant intercourse with brothers, sisters, and parents. With all these advantages there are joined a great many disadvantages. The child has less incentive to exertion, and there is not present the stimulation afforded by the progressive education of those of his own age. Then again, the benefit derived from play, which experience has proved to be of such importance to the proper development of the faculties of the child, is impossible without numbers. Quintilian called attention to some dangers that the constant intercourse of a child with adults might bring about. There also must necessarily exist a distinct trend, both social and religious, in each family, and this, acting upon a mind unable to take a proper perspective, naturally gives rise to prejudice and narrowness. But with all the deficiencies of individualistic instruction, parents continue to have their children as far as possible so educated, because they thereby insure the recognition of that which is of more importance than anything else—the individuality of the child.

Every system of education worthy of its name must train the child to find his place in society, and must teach him those obligations towards his fellows which will enable him to live a healthy social life. But this recognition of the child's future place in society is completely in harmony with the doctrine of individualism. The social organism and the individual are two phases of a symmetrical whole, each one supplementing the weakness of the other. It should not be forgotten that the progress of society depends on the contribution made by each individual, and that, in order that this contribution may be the greatest possible, every one should have an opportunity to develop the special powers which God has given him. The whole world seems out of joint to him whose individual desires and cravings are continually suppressed. George Eliot has expressed this: "It is with men as with trees; if you lop off their finest branches, into which they are pouring their young life-juice, the wounds will be healed over with some rough boss, some old excrescence; and what might have been a grand tree, expanding into liberal shade, is but a whimsical misshapen trunk."

It has been stated that these two phases of education, class and individual instruction, can be practically reconciled so as to combine the advantages of both systems. Experience has shown this to be true. We are far from complete success, but great progress has been made in various ways. 1. Promotions are no longer arbitrarily made at the end of stated periods; rather is the child advanced as rapidly as his peculiar powers permit. The many attempts to devise the best system of promotion to secure this end, are efforts made to attain the ideal. 2. Stated examinations have been done away with in many places and allowance thereby made for powers that cannot be computed by marks or per cents; the teacher's insight is the arbiter as to fitness for advancement. 3. Elective studies are provided to appeal to individual peculiarities. Thus the pupil is enabled to select those branches for which he is most particularly fitted, instead of being compelled to dissipate his energy on subjects for which he has no natural inclination. 4. Child study is another means by which we seek to gain a better insight into the developing mind of the child; and while the results up to date may not have been commensurate with the time and patience devoted to the subject, few will deny that we know more of the child and his peculiarities than we did a generation ago.

To get an insight into the life of our pupils we should profit by the experience of their former teachers, and transmit our results on to others. I am not blind to the defects of this plan, but teachers, I believe, will soon learn to take the results tentatively, and to form no hasty opinion until experience has confirmed the report, for the human being is a complex organism, subject to sudden and unforeseen changes, intellectual, emotional, and volitional, which must be taken into consideration by all who deal with children. The records of pupils, to have any value, must be systematic. Information under the following headings would probably be complete enough to give succeeding teachers a sufficient insight into the nature of their pupils.

1. Name.
2. Age.
3. Time in different grades.
4. Parentage.
5. Temperament.
6. Health-Diseases—especially Chorea, Myopia, Deafness, Phthisis.
7. Record in the different studies.
8. Books read.
9. Interests displayed in matters outside of school.
10. Home influences.
11. Moral development, Honesty, etc.

The information thus obtained will enable the tactful teacher to handle his pupils in a general way without committing blunders avoidable by a knowledge of the peculiar disposition of a child.

Nor is this all. Instruction must appeal to different natures. The teacher who has but one way of presenting a truth will appeal to a small part of his class. What a disadvantage it is that we cannot feel intuitively how different minds work. Prof. James says somewhere that a bridgeless chasm separates two minds. When once the teacher recognizes that the mind before him is utterly different from his own, swayed by different impulses, appealed to by different interests, actuated by different motives, how many of the disappointments of teaching will be at least accounted for! The instructor fails to comprehend why the lucid presentation of a given fact can be productive of such barren results. Alas: the presentation may have been clear to the teacher's mind, but all intellects do not function alike.

The remedy for this lies in a manifold and diverse presentation of the educative material. It is true that the mind of the teacher is finite and can devise only a limited number of methods, while the number of pupils which one is called upon to deal with may be hundreds; yet the teacher may take advantage of the different aspects under which the pupils view a problem, and may thereby secure not only the material for a manifold presentation but the other advantages previously enumerated. Beyond such general statements as these, no more definite rules can be laid down for guidance, for any attempt to be more specific would enlarge the scope of this article to a book on method, and would moreover be in direct violation of the principle that the teacher, in teaching, must be secure from the imposition of dogmatic rules. Every one must develop his own methods for each subject, taking the precaution that these do not contravene the general principles which experience and scientific inquiry have decided to be essential elements of success.

Preparation Of The Teacher For Class-Room Work.

By **Bernard J. Devlin**, Instructor, New York City.

THE complexity of our age, as against the comparative simplicity of preceding times, requires, on the part of pupil and teacher, a wider and more varied preparation. Dr. Harris tell us that "more and more society invents ways by which the individual can feel his own selfhood fully recognized in the requirements of social order"; and surely this truth was never so pertinent as at present. All progress is conditioned by the methods employed in seeking to obtain this individual freedom, and all methods must have regard to the demands of our modern civilization and to the complex nature of the child organism.

As, happily, most class-teachers are spared the selection of the studies that are best calculated to afford individual development, and at the same time satisfy the requirements of that individual's environment, and as the preparation of the teacher for his position is beyond our province, we have then to consider only the preparation necessary for the teacher's daily work. The general considerations most applicable are the quantity of the preparation, and the quality of the preparation.

The quantity of the preparation has as many sides as there are teachers and classes. Some teachers, with a minimum of preparation get a maximum of results. Some classes of children—for classes undoubtedly possess individuality—will take the maximum amount that the teacher has prepared. No one may say just how much time must be spent in the preparation of any lesson, nor do written exhibitions of such work show more than probable facts. Certain general truths, however, exist. *Some* preparation is necessary for every lesson, if the teacher's knowledge is to be exact and fresh; but the teacher's ability will influence the amount. Notebooks are valuable, more as proof of preparation than as essential requisites for teaching. With proper knowledge, an outline may serve the purpose better than the most detailed plan. It is granted that in most cases the necessity of putting everything in writing destroys spontaneity in teaching. The new delight, which comes to the teacher in the preparation of a familiar subject, is exhausted through the over-activity of the pen; and the spurious afterglow in the class-room fails to arouse to its fulness that indefinable sympathy of pupil with teacher, which lies at the bottom of all true interest. Moreover, elaborate notes, preserved from term to term, are common causes of machine-teaching, and are direct preventives of that ever necessary new recourse to original resources. Infinitely more profitable to teacher and taught is the study of a new work on an old subject, as this only can be fostered that "divine discontent," which is the secret of success in any art or science.

The *quality of the preparation* will test the teacher's knowledge and estimate of the psychologic elements that underlie any subject, regarded as something to be taught. The first consideration is the nature of the subject, and the next is its relation to other knowledge possessed by the class, or their attitude toward the subject. These considerations will induce in the teacher such self-questioning, as: How may this subject be taught most effectively? How many and what formal steps of instruction shall occupy the lesson period? Such pedagogic insight does not necessarily come from books, as the fact—teachers are born not made—proves; but books are indispensable means for aiding us to a clear knowledge of what we do intuitively, and therefore, often, blindly. In the discriminating use of the underlying psychologic elements the artist distinguishes himself from the artisan. Therefore effectiveness in teaching will require a thorough analysis of all accompanying conditions so far as they may affect the pupil and the end to be attained. The nature of the subject and the end to be attained will decide the method to be employed. Is it a lesson for the development of principles? The inductive or development method must be employed. Does the teacher purpose a drill? Deductive reasoning will occupy most of the time. Skill in teaching means the effective employment of the two methods, and a due recognition of the limits of each.

The five formal steps of instruction so definitely marked out under the names, preparation (of the pupil's mind for the subject), presentation, comparison, definition and application, must be kept clearly in mind during the preparation of a lesson. Do the steps apply to the given subject and how far? Shall we make use of all the steps in one lesson, or shall but one or two steps enter? How much of the time shall be devoted to the preparation? How much to the presentation, etc.? These questions must be determined in the teacher's preparation if there is to be economy in the method pursued. Here then we leave general considerations, and turn to the somewhat more specific preparations of particular subjects.

In the study of a literary masterpiece, we bring to mind the fact that every narrative of considerable length naturally falls into a number of divisions, each of which, in itself, is more or less of an organic unity. Each of these unities is known as a method-whole, and as such, calls for the application of the steps of instruction. Again definite portions of the text must be marked out for memory work and for elocutionary drill. Word-study calls for the selection of such words as may be judged of greatest use to the child. These words must become familiar by their employment in sentences, which the child thoroughly understands, and which may be found by the pupil himself in standard works; or in default of these, may be furnished by the teacher. This is but one way of familiarizing the child with new words, and may be supplemented by explanation, diagram, or any other means that the teacher finds effective. Needless to say, this will rarely be by definition. Sight of these words must never be lost by the teacher; they must be employed by him, as well as by the children, at every available opportunity. Words for spelling are to be grouped where possible, according to relations that the ingenuity of the teacher may discover; and wherevever possible, by bringing up related words not in the lesson, rules must be induced.

To the average teacher, few subjects present less definite results than composition, and few subjects receive less preparation. The causes are various, and do not need enumeration; the remedies are many. More than half the difficulties disappear on the choice of a proper subject. The most important requisite of a proper subject is unity; and that unity must be regarded by both teacher and pupil as something to be approached, something to be talked of, and something to be left—gracefully. Keeping in view these three points—introduction, amplification, and conclusion, something like definite and rational results may be looked for. A proper subject, moreover, must be capable of clear outline, or amplification will suffer in sentence and paragraph structure. Finally, our subject should be of such a character and length as to permit of clear outline, oral expansion of the same, and written reproduction, all, in the time allowed. It is assumed that the total time for composition has been divided into a number of periods for each subject of composition. Preparation for any written reproduction will also take into account past, general errors and will set apart some time for their presentation and correction.

Preparation in arthmetic must have regard to the advance work and to the review. The former can be most conveniently laid out for the term, considered as made up of weeks. Then the plan will be elastic enough to allow of that spontaneity without which arithmetic loses the greater part of its value as a discipline. From the nature of the subject, lessons in arithmetic are of two kinds: lessons for the acquirement of principles, and lessons for the applications of those principles. The latter are called drills. The great danger in the preparation of drills in arithmetic, is that the examples selected are often not of a practical character, and too frequently partake of the nature of conundrums.

The Attitude Of The Class Teacher.

By A. C. McLachlan, Principal, State Normal School, Jamaica, N. Y.

A MAN of great intellectual strength was one time asked what was the greatest thought he ever entertained, and, after some reflection, he replied, "My responsibility to my God." A teacher's responsibility to his God on his own account is very great, but when he has forty, fifty, or a hundred children in his keeping, whose lives he must influence, his responsibility is multiplied forty, fifty, or a hundred times.

No teacher should enter the profession who does not conscientiously entertain this thought. It will give to his work a higher dignity; it will exalt and purify his purpose and reveal the pricelessness of the material upon which he expends his labor. In consideration of it, he will see his pupils as they are, with all the possibilities of human life within them, and, because of it, he will desire to draw aside the veil of the future to see what may be the character of the men and women that will result, in a measure, from his labors. As wax answers to the seal, and clay to the potter's touch, so the plastic lives of his children will yield to his own life and character.

"Personality," some one says, "stands for eighty per cent. in the make up of a teacher." Of the right kind, it signifies largeness of heart, magnanimity, conviction, strength of purpose. From such a personality influence radiates. It produces an atmosphere inspiring and sustaining; it develops hope and courage and determination to achieve. Silent, like the heavens, it declares the glory of God, and wordless, its speech is intelligible to children from every land.

The attitude of a teacher toward every child should be such as to make possible a kind of spiritual union between them, a sort of at-one-ment expressed not inadequately in the one word sympathy. "Sympathy," it has been said, "is the crowning qualification of a good teacher." It is the touch of nature that makes a whole school kin. Of a healthful, wholesome stimulating kind, it signifies no weakness, but strength. It vitalizes for earnest effort, and gives courage to meet difficulties and surmount obstacles. With mutual respect and confidence between teacher and pupil, conditions are most favorable for words of instruction wisely spoken.

A teacher of high purpose, strong personality and generous sympathy seldom needs to resort to the hammering-in process of instruction. He removes the cover from the kettle before he attempts to pump in the water. He prepares the stony ground before he sows the seed. He stirs the inner life of the child until it reaches out as with spiritual arms to take the knowledge that is at hand.

We grow by our enthusiasms. It is life that awakens life. A dead black coal will not impart heat to any thing with which it comes in contact, but a coal alive and glowing with heat will set aflame every thing it touches. A "dull and devitalized teacher" will awaken no interest in the pupils, but one aglow with deep and abiding enthusiasm will set aflame their hearts and minds. There is nothing more contagious than enthusiasm ; if the teacher has it, pupils will catch it. A teacher possessing a capacity for enthusiasm is sure to be in a state of constant self-renewal and self-improvement. With him there will be no offering of stagnant water nor serving of cold victuals, but knowledge will sparkle with freshness and instruction will be given "hot and steaming."

Successful class instruction depends not a little upon careful gradation of work. The teaching of one day should effectually prepare for the requirements of the next. Tasks should never be to difficult as to discourage effort, nor so easy as to make it unnecessary. If work is wisely graded, and carefully and judiciously assigned, the child need not experience a single failure. It is possible for him to go on from conquest to conquest, daily acquiring confidence in himself and gaining that power which comes only from self-realization. It often happens that victory is won before the battle. He who thinks he is able to achieve is quite sure to be right about it. When, with good reason, one believes he can, he is king. In no other way can a teacher display his art so finely as by putting a child in possession of himself—by making him realize and utilize the powers at his command.

This result will not be accomplished, even with work well graded, unless the teacher expects each day's work to be done. What we expect from our pupils we may get, but if we expect nothing in particular we are likely to get just that and nothing more. To the pupil nothing can take the place of careful preparation of lessons each day. No instruction by the teacher, however good, can be a substitute for it.

It becomes, therefore, the duty of the teacher to show the pupil how to study—how to prepare his lessons. First of all he will endeavor to develop a proper motive for study. Then he will strive to lead his pupils to apply the psychologists' rules for the formation of habit to the formation of the special habit of giving undivided attention to study. He will teach them to illustrate and compare and comprehend facts in their relations. He will train them to see with the eyes of their mind and to listen with the ears of their understanding. He will not permit them to forget that "the reward of well-doing is ability to do better."

Some teachers conceive the idea that they may awaken interest in a study by being very generous in giving assistance. They make themselves a kind of "penny-in-the-slot machine." Upon little solicitation they give forth their aid. They show, they tell, they solve the difficult problems and analyze the difficult sentences in the hope of exciting interest. How great the mistake! Nothing could be more contrary to nature. They drain the very fountain of interest. Interest, they should know, is largely the product of search and discovery, struggle and achievement. It is a large element in the joy of conquest. The pupil, therefore, must be incited to make his own conquests and win his own victories, to catch his own fish, and capture his own game. In homely phrase, he must hoe his own row, he must paddle his own canoe.

There is a beautiful law of compensation running throughout the universe. It appears to the student in the fact that he acquires the strength of whatever he conquers. It is expressed in the words, "the strength of the thing we overcome yields itself to us." "Heaven helps those who help themselves," is a wise saying, but heaven help those whom the teacher helps too much, is a prayer that needs often to be prayed. Of course, I do not mean that the teacher should assume that the pupils need no help. Some assistance must be given, but it should consist chiefly of guidance, suggestion, and encouragement, not so much of explanation. The good instructor, with all the ingenuity of a fertile and resourceful mind, should strive to make himself as useless as possible to his pupils by *making* them independent of him. He should endeavor to make his pupils take care of their habits, so that in time their habits will take care of them.

Judicious commendation is always an effective ally of good instruction in stimulating pupils. It often touches the very springs of effort. The successful instructor utilizes it. He is constantly watching for something worthy of approval. He realizes, however, the peril of flattery, and he will never betray himself into the use of fulsome praise. He will not kill the fatted calf when the prodigal needs no meat. Neither will he praise so faintly as to damn. A word of honest commendation, heartily spoken, at the right moment encourages and inspires, and sometimes marks an epoch in a child's life.

Inspiring class-instruction is often characterized by an economy of words. The more perfect the plan and the clearer the thought, the less need of many words. The teaching word, like the magnetic needle, points the way. Many of our best ideas are born in silence under the stimulus of suggestion. The needed word illustrates, classifies, and "fits new knowledge to old experiences."

There is a concise language of things that is too little studied in our time. A celebrated teacher of science, one day went before his class to lecture. He distributed to his students familiar specimens for observation, and, stepping upon the platform, he said, "look !" After some time had passed he said again, "look!" The lecture was finished. It consisted of a single word, but those students saw that familiar object that day as they had never seen it before. Therefore, we are justified in saying that the objects of nature, eloquent though silent, speak to the child and teach him. Darken not their speech by a multitude of thine own confused and confusing words.

In a third-year class, a lesson preparatory to one on soil-making was given, showing the contraction and the expansion of water as affected by heat and cold. Not a word was spoken. A tall, narrow bottle was filled with ice water, and a perforated rubber stopper was securely fitted in its mouth. A long glass tube was inserted into the stopper, reaching to the water. The bottle was then placed in warm water. Soon the water began to move up the tube. Higher and higher it climbed, until it overflowed the tube. Without speaking a word the instructor wrote *expands* on the board. He then took the bottle out of the water and packed it in a mixture of salt and ice. The children saw the water in the tube go down, down, until the tube was empty. Then the instructor wrote on the board *contracts*. Throughout the whole exercise not a single word was spoken, although the children could hardly be restrained from speaking. The time being up, the class was dismissed. On the following day, in order that expression might not fail to follow impression, the children were asked to tell what they had seen and learned, and they did it so well, and with such an exhibition of interest, that they quite surprised and delighted a number of normal students who were present and who had also witnessed the experiment.

Quite as important as economy of words is a choice selection of words and felicitous expression. The dull, stale, insipid forms of speech employed by some teachers weary their pupils. Their platitudes and commonplaces, attended by the expression of face and the tone of voice which usually accompany them, make pupils feel at the end of a half-hour recitation as if a quart of blood had been drawn from their veins. Thought, to be most useful, must be couched in suitable words. Thoughts, to be remembered, must be expressed in language that will arrest and hold attention. Instruction that is most effectual is characterized by freshness and brightness of expression and a little mother wit.

In order to teach a little well it is necessary to know a great deal thoroughly. The time has gone by when it was believed that a person with a modicum of knowledge could teach satisfactorily. Nothing is more deplorable than the sight of a teacher employing a maximum of method with a minimum of knowledge. The barrenness, the poverty, the inaccuracy of such teaching is blighting to interest. We are in complete accord with Professor Münsterberg to this extent—that we believe profound scholarship is a splendid auxiliary to good teaching ability.

The Desirable Attitude Of The Class Under Instruction.

By JOHN DWYER, Principal, New York City.

TO condition a class so that its attitude towards effective school work is favorable for the best results requires of the teacher not only professional ability of a high order, but tact and ingenuity as well. The routine teacher working for examination marks cannot compass it; neither is the severe task master who enforces his stern orders by the rod or the threat of punishment more likely to accomplish it than is she who spends her days in seeking merely to amuse the pupils.

Though knowing, feeling, and willing are indissolubly united in every state of feeling, act of willing, or knowing; yet in each act or state of the mind some one of these three activities stands forth as the dominant factor. It is only, therefore, by abstracting this dominant factor from the state or act and treating it as though it existed alone, that we are enabled to treat this subject in its three aspects of the feeling, the intellect, and the will.

I.—Though the feelings can be educated only through the intellect and the will, they still perform a very essential part in the educational process by their reaction on the latter two. Theoretical views are gained by the intellect, and if these views be carried over into action by the will until a habit is acquired, this habit and these views will harmonize and result in a susceptibility to a feeling or tendency to act. The clearer the intellectual views and the more fixed the habits come to be from the carrying of these views into action, the stronger becomes the feeling or conviction. The feelings and tendencies resulting from the harmonious workings of the intellect and the will are a very powerful stimulus to strengthen the will and to further intellectual progress. The desirable attitude of the class, therefore, with regard to feeling, is very essential to class work. In recent years many marked improvements have been made in teaching. Milder, and in most cases better, methods of discipline are coming into vogue; the forcing process of the past is being abolished, and the better feelings of the pupil are aroused. The dry and dull routine of other days has been replaced by more interesting methods. The feeling of interest is aroused at every stage of school-work. Many teachers, in their great anxiety to be abreast of the times, deem it to be their duty to interest those under their charge at all hazards, and instead of giving the pupils a permanent living interest in their school-work, are wasting time and effort in amusing them. All school-work cannot be made pleasurable to the average child.

Class feeling, if judiciously aroused and maintained, has a most potent influence in facilitating class-work; on the other hand, if this feeling be not properly conditioned, the work cannot be a real success. In the lower grades this is of special importance; for the child's will is guided largely by the feelings—the feelings shade into desires, and these produce acts of willing. In these little ones, the emotions stand supreme, and are the impelling power driving on to success.

Even adults, as well as pupils in the higher grades, are largely influenced by their feelings, which are the results of repeated judgments acted upon by the will until habits of feelings are acquired.

These feelings are a mighty force to influence acts of the will or to further intellectual work. In each of us set views and old-time prejudices are the will and the intellect harmoniously blended. The will carries the views of the intellect into action until a habit of feeling is formed. In times of great moment an eloquent appeal to the feelings will often sweep away all barriers placed before it by the intellect and the will. Concerning this subject Doctor Harris says: "The mind flinches from looking at considerations hostile to the reigning mood of feeling." Professor James re-enforces the foregoing in the following statement: "The economical tendency to leave the old undisturbed leads to what is known as 'old fogyism.' A new idea or fact which would entail extensive rearrangement of the previous systems or beliefs is always ignored in case it cannot be interpreted to tally harmoniously with the mind."

Lack of proper class feelings is occasioned often by the injudicious teacher who consciously or unconsciously engenders it—it may be, perhaps, by nagging and scolding; by sarcastic remarks and acts of injustice, by overloading the pupils, thus causing despondency; by the indifference of the teacher; by keeping pupils in a state of fear and anxiety; by making them "passive recipients and not active inquirers;" by rote teaching and by unfavorable physical environments.

A teacher, on the other hand, may induce in a class feelings which will insure success. Enthusiasm on the teacher's part will induce a like spirit in the pupils. Children unconsciously imitate their teacher; the adult in a great measure is what he is because of imitation; from imitation springs emulation, and these two, says Professor James, "play absolutely vital parts in the class room." According to this author, "the feeling of rivalry lies at the basis of our being; the sight of action in another is the deepest spring of human action."

Let the teacher, therefore, be the leader and not merely the giver of commands. Let him also cultivate in the pupils a spirit of generous emulation until there is produced a noble ambition—an ambition and a hardy spirit to overcome difficulties, to master tasks of whatever sorts. Most pupils if properly trained delight in overcoming difficulties and every one mastered gives them added strength for future conquests. While success creates a spirit of buoyancy, failures produce disappointment and indifference, and if frequent will in time create what Spencer terms a "permanent constitutional depression." The spirit of success induced by their many victories, made the armies under Napoleon irresistible; while the opposing armies were made correspondingly weaker by constant defeats.

Give the pupils lessons, therefore, that can be mastered, and at the same time make them difficult enough, so that vigorous work will be required on the pupil's part. If pleasure in accomplishing tasks favors mental action, failure to cope with them must be unfavorable to it.

II. If this be so it must be of vital importance that the tasks set are suited to the pupils. They will be suited only if a proper feeling of interest is possessed by the class. All of us know by experience how fleeting is the acquired knowledge to which is attached no permanent interest. If the knowledge is to be retained it must have for us significance. How fondly we linger over historic scenes and how well we remember the many incidents connected with them. Scott in his writings has waved over many scenes his magic wand, and how vividly do we recall these because of the interest attached to them. Irving's writings give added charms to the sunny land of Spain. Prescott has thrown a halo of interest over the ancient history of Mexico and Peru. With what an absorbing interest will a boy in the adolescent period read and re-read the writings of those authors. For him they have a permanent interest because of the pleasure he has in reading them. Dr. McMurry recommends the cultivation of "a healthy appetite for knowledge and the setting up of interesting aims and desires at every step." The knowledge we would retain must be associated with interest.

The grade teacher often makes a serious mistake in disregarding much of the knowledge acquired in the lower grade. A wise teacher will take advantage of facts learned in lower grades, because we learn the new by associating it with the old. Old experience should be brought in frequently. That which is entirely new cannot be of interest to the pupil, because he is not able to grasp it. His interest is aroused in seeing the old in the new. The aim of the teacher should not be to amuse but to instruct and to interest the pupil in his work.

Thorough mastery of the subject induces interest, but this does not mean that all the details should be remembered. To retain the essentials is sufficient. Nothing which cannot be assimilated should be given, else interest will be destroyed. The feeling of sympathy with the pupils, if properly conditioned, may be made a source of great strength, particularly with young pupils, from whom a response is easily evoked by a teacher who shows in varied ways that she is deeply interested in their welfare.

The great importance attached to examinations in many quarters, tends to cause a great many schools to assume a false attitude to school-work from an intellectual standpoint. This common practice of estimating the value of school-work by examination marks causes pupils whose work is so estimated to assume towards education an attitude that is antagonistic to proper mental development. Pupils having such an attitude are perhaps well fitted to acquire facts for examinations. This great mass of information, not apperceived nor assimilated, is taken into the mind for a specific purpose and when this purpose is accomplished, all interest in it ceases to exist, and it drops out of the mind. This process not only overloads and weakens the memory, but destroys interest, weakens the will, and arrests the development of the reasoning powers and of the imagination.

Instead of the pupil's attitude being that of the passive recipient, let it be that of the active inquirer. Pupils should not acquire facts merely, but should assimilate them as well. The process of education is an active one. To be of any significance to us the new ideas taken into the mind must be interpreted by the old. The new may be very much modified by the ideas already in the mind. The attitude of active inquiry will evoke the self-activity of the pupil, and to accomplish this is a most worthy ambition for every teacher. Self-teaching under the careful guidance of an efficient teacher will strengthen memory, because the facts gained will be assimilated. The active inquirer, because of his interest in investigating and observing, has clear sense percepts and clear ideas, and these serve as a most excellent basis for a retentive memory; while the latter serves as a good ground-work for the development of the imagination, as well as for the training of the judgment and reason. The pleasure of mastering difficulties without the teacher's aid will induce an interest which will give a permanency to the knowledge acquired. Anything that requires great effort will cultivate the will power. This attitude of inquiry will lead the pupils to detect the similarities in the old and the new. If pupils lack this power, assimilation cannot take place. This attitude of active inquiry on the part of the class does not exist under the regime of a weak teacher, but under the guidance of a wise and enthusiastic teacher, it may be brought about and properly directed; for in the words of Doctor Harris: "The direction of human activity is yet dependent on human judgment." A teacher who spends her time listening to the repetition of the rules and definitions of the books, and by stern commands and petty punishments secures forced attention to this dull and deadening routine is producing a class attitude that is fatal to progress. In a class so taught neither interest nor the proper kind of activity can be shown. A teacher who leads her pupils by careful discrimination on their part to grasp the essentials, and who discourages rote teaching by paying more attention to the content than to form, cannot fail to produce in the class a proper intellectual attitude. This should be supplemented by leading up to definitions, rules, and principles from concrete individual cases whenever possible, and then by returning by the deductive process; for as far as possible, theory and practice should go hand in hand. In our city system, the deductive process is of extreme importance, since of late many teachers, perhaps, give undue prominence to the inductive method. Essential as is the latter method, in certain studies, it is absolutely necessary to supplement it by the deductive process if satisfactory results are to be secured.

III.--Ability to utilize knowledge is of far more value than capacity for its acquisition. Knowledge is not power if the ability to convert it into action be lacking, and to bring it into action rightly, requires a strong will—a will that controls, and decides, and brings under subjection all the other powers of the mind. The course of action, though chosen by the intellect and influenced by the feelings, is executed by the will, which should stand forth as the supreme power of the mind.

Doctor McMurry says:

"Strength of character depends entirely upon the mastery which the will has acquired over life; and the formation of character as shown in a strong moral will is the highest aim of education."

There are many people who know what is right and are anxious to act in accordance with correct views and yet fail lamentably because strong moral will is lacking. Good intentions and knowing what is right are not guarantees of right conduct. There are many pupils swayed by contending passions and opinions, who fail to perform their duty both at home and at school because the will does not perform its proper function. Many pupils spend a goodly portion of their time in "day dreaming," in planning for future conquests, but allowing the tasks of the day to go unfinished, or in fancy they may relieve thousands of suffering humanity, but fail to sympathize with their fellow pupils. They may weep over the sorrows of heroes and heroines in works of fiction, and may do little to alleviate the heart burning of beloved parents. They may be anxious to achieve success, but have not sufficient will power to apply themselves to the hard tasks of the school-room.

Interest As A Condition Of Instruction.

By WM. F. BABCOCK Principal, Paterson, N. J.

IT IS natural for the human mind to find enjoyment in that which is presented to it in an attractive way. This tendency of the mind to be allured is interest. We cannot conceive of a person being in a state of attention, of being actively interested, unless the interest is in something; unless the attention is focused on some subject. An object or a subject may be intenesly interesting to one mind and excite no interest whatever in another. The interest is wholly subjective. It is the individual mind, with its own individual apperceptive ideas, which has interest in anything.

While attention is closely connected with interest, the two are not identical. In the former, the volitional element predominates; in the latter, the feeling. When the interest ceases, attention wonders, and unless held by an effort of the will, i. e., unless it becomes voluntary attention, will fix itself upon some new object.

When something which is in itself attractive is presented, the interest is direct, as the interest which a child takes in a kitten. This interest is also termed intrinsic, since the attraction to the mind is found in the object itself. Indirect interest, as that which a boy takes in shoveling snow for a promised reward, is sometimes called mediate interest. It is the former kind of interest, immediate in its character, which is a necessary condition for instruction, and which must find a place in every lesson, if that lesson is to make any permanent impression on the learner. If interest is awakened at the beginning of a lesson and maintained during its development, the pupil has a feeling of a pleasurable character, and his mind is in the most favorable receptive state.

Animate and inanimate nature allure the attention; interest in these never flags. The different fields of thought, when properly presented, i. e., at the right time and in an appropriate way, appeal strongly to the interest. With, this natural, direct interest, is combined pleasure. The expression of this interest is the satisfaction of a need—the necessity of self expression.

The mind is in constant motion, its action is continuous, but it tires when the attention is long directed towards one thing. In the contemplation of any object, in the fixing of the attention on any subject, a time comes sooner or later, when the interest flags. But if interest be properly secured at the outset, if the thoughts engendered be pleasurable, the attention will be held much longer, and the labor of application necessary to master a difficult subject will be endured.

When interest in one subject fails, other subjects attract, and, after a time, the first subject may be taken up with renewed interest. The flitting of interest from one subject to another is marked in young children. So long as interest is maintained, involuntary attention accompanies it. With older children, longer periods of interest may be secured, and with adults, interest in one subject may become so absorbing that everything else is shut out. On the other hand, forced attention, secured by mediate interests, as the fear of punishment or the hope of reward, rarely develops true interest, and may render the subject so unpalatable that interest in it is forever lost. Direct interest becomes strongly associated with the knowledge as it is acquired, and will-activity springs spontaneously from it.

In all studies interest is greatly enhanced when the pupil can *do* something. The gratification which comes from motor-activity heightens interest. In securing interest, the skill of the teacher is shown as in no other way. His personal attractiveness and his use of devices are of much help, but he must have the proper educative material to work with. The subjects of study must in themselves be attractive to the child in order to secure his interest.

Direct interest, as a means of securing attention, is an indispensable condition of instruction. The active mind of the pupil is interested in something. If that interest be not in the subject presented by the teacher, it is in something else, and until the pupil does take an interest in the subject, he will not learn. A knowledge of the ideas already in possession of the learner is necessary to the teacher. The pupil experiences a pleasurable feeling when he finds that he is adding to his already secured ideas. Hence, the providing of short apperceptive steps helps to secure and maintain interest.

Interest confined to one or a few subjects leads to narrowness. A many-sided interest, an interest in all subjects which include the knowledge of the normal human being, leads to broad-mindedness, a large sympathy with people and things, to saneness. The development of this many-sided interest is a most important part of education. Not only is it of intellectual value, but large healthy interests in proper subjects are the strongest moral forces.

Apperception In Instruction.

C. C. Van Liew, President, State Normal School, Chico, California.

THE longer this so-called principle of apperception remains a subject of discussion among those who believe it may be made to contribute to a science and art of teaching, the more comprehensive do its practical bearings appear. Herein it but shares what is common to all large conceptions. They enter the world of thought as great, striking, comprehensive theories, and in proportion as they possess any practical vitality whatever, they in time come to penetrate and shape practice in many unforseen ways. But the influence they exert is also retroactive. The "refiner's fire" of practical experience is more than a test of the right of a theory to be; it is equally a revealer of the true significance of the principle. The latter comes out of the practical contest a little more conscious of its own true nature, with greater faith in its own power, and with much broader knowledge of its real significance.

This is precisely the history of the principle of apperception. Its first great service was to cause teachers to reflect upon the learning process with which they dealt, even in the midst of class-room practice. Its second service was to assist teachers to appreciate how many elements, conditions, and processes are really concerned in this function called teaching, and in its correlative learning. It first emphasizes a process, in the form of a very broad general principle; and then by carrying this principle into critical and reflective practice, it secures an attention to the great variety of problems involved, very many of which were not suspected when the emphasis lay chiefly upon the principle in its general discussion.

Hardly any scientific statement of the single principle of apperception can be given, psychologically, which would meet the requirements of exact definition. From the psychological point of view, the principle, as practically conceived by the teacher, is altogether too broad for exact and definite limitation. For the teacher it stands for a large group of mental relations or mental processes, all of which belong to the complex process of learning, and all of which therefore constitute essential conditions to be met in the acts of instruction.

This history of the principle should repeat itself in each individual teacher. A very few chapters or lectures on apperception suffice to give the teacher a comparatively intelligent theoretical grasp of the principal. The vital issue belongs to the practical test of the class-room. If your professor of pedagogy fully appreciates the difficulties of this principle, when he tries to explain it, he will early cease fine analyses and send you back to the school-room to rediscover it in concrete problems by reflective practice. Equally it should be the province of such an article upon "Apperception in Instruction" as the present, to suggest some of the problems which are involved in this reflective practice.

Let us take "apperception" very broadly and practically, as the process of assimilating new experiences, ideas, principles, facilities, etc., by interpreting them in terms of one's own past experience. Let us omit any theoretical or psychological discussion of the conception in general, since the outcome would probably be a number of principles instead of one, and proceed at once to consider what the term apperception suggests to the practical teacher. This method of approach may in the end require some further psychological foundations, but not of the principle as a whole.

1. *The Individual Requirement.*—The very first condition of all instruction which a consideration of apperception should bring home to the teacher in practice is that which is imposed by the individual pupil. One of the commonest errors in instruction appears when the teacher assumes that the *logical* presuppositions of any subject or topic constitute their sole, their best apperceptive basis. They may or may not be the most effective personal resources for grasping the new ideas. Let the following observation of the writer illustrate: The teacher was striving to have the class reason out how many times 2½ are contained in 15. The attempt was somewhat premature for most of the class; but it succeeded with "John," and for very personal reasons. The teacher said: "John, you sell papers every evening, do you not?" "Yes." "How many do you get for 5 cents?" "Two." "How many cents represent the cost of one paper?" "Two and one-half." "How many papers do you get for 10 cents?" "Four." "How many for 15 cents?" "Six." "How many times are 2½ cents contained in 15 cents?" "Six." "Keep thinking of your two papers for each nickel, each paper costing you 2½ cents. How many times are 2½ cents contained in 20 cents?" "Eight." "In 25 cents?" "Ten," etc. The teacher succeeded in this case fairly well not only because she appealed to him in the thoroughly concrete terms of sense (viz: papers, nickels) always required for any thought at his age, but because the experiences they suggested (buying and retailing the papers) were thoroughly vital and personal to this individual, colored by his interests and strengthened by his habits of life. This will serve to illustrate in part how individual the problem of apperception primarily is when put into efficient practice.

But what of the other nineteen or more pupils who did not grasp the relations involved through these or any other such personal resources? If their teacher were possessed of that very needful power of reflective practice, already spoken of, she would have discovered in this boy what the others lacked, viz., personal and practical experience or occupation with a standard of measurement which fits the case, and which could bring some habitual reactions to bear on the new relations. She will accordingly see to it that each indivdual is supplied with such personal activities as will create the fund of well established memories upon which to draw in future.

It is true that in proportion as we advance through the years of elementary, secondary, and college education, the prominence of individual conditions in instruction diminishes. Children coming to the Kindergarten or Primary School from very different homes, communities, and natural surroundings require a much greater individual attention, so far as the class room method is concerned, than students whom education has brought up to the common level of the larger social interests and the more universal elements of environment. Education tends, in part, to shape individuals with a common social end in view, and hence supplies them with common experiences and ideas. Partly through their actual contact with one another socially, then, and partly through the efforts of each individual to acquire the traditional social inheritance of his generation, there is created a certain rapport among all individuals which may constitute a common apperceptive basis in their instruction.

But even then the skilful instructor will not throw away his regard for the force and stability of the peculiarly individual experiences. For this reason instruction in secondary and college education, which too often contents itself merely with extensive consignments of knowledge to and from the student's memory, should seek to call out the individual more and more by employing the methods of the debate, seminar-discussion, and in general of original effort and production. Those who have reflected upon the relative value of their educational activities in these years, cannot fail to observe that the greatest speed and stability in acquisition, not to mention joy and zest in the work, depended upon the very personal centres of interest which were awakened.

The same is even true of instruction to adults; it cannot escape this individual condition. For example, he is the most successful lecturer or orator who can touch the personal experience, ideas, feelings, moods of the greatest number of individuals. The hardest audience to address is the mixed audience; it calls for the greatest variety of illustrations, the most varied rhetoric. A very prosy, unimpassioned and stilted specialist may succeed admirably in holding the attention of an audience of like specialists with a single line of technical, but important, ideas. He operates as with a single individual; the more popular speaker, to succeed, must possess a quality akin to the instinct or training of the teacher,—power to put himself successively in emotional or intellectual touch with many individuals. Like the teacher, the successful orator, is furthermore, for this same reason, a person of the most apparent and most universal sympathies.

Thus apperception teaches us the need of studying the individual we would instruct. What has he been, felt, experienced, accomplished? What residua of life's experiences still lie hidden from us, but awaiting the skill of our suggestions to bring them to light where they will focus upon a broader field and illumine it? What better function can we serve in instruction, than to stimulate the individual to put *himself* thoroughly into the intellectual and spiritual life of mankind, that it in turn may enrich him? But, like the physician who would refuse to prescribe for any disease in general until he was acquainted with its grouping of symptoms peculiar to the individual and tinged with the latter's idiosyncrasies, we must first know some of our points of contact in the student. There is no gainsaying the truth that in proportion as our classes are large and unwieldy, we are forced to limit our study of individuals. But this practical difficulty can never put aside the individual requirement, which sets an ideal, the extent of our approximation to which will always condition the success of instruction.

And what does not this life, which childhood and youth live, offer of available individual resources, stored up under the stimulus of keenest interests? Home with its social and industrial interests and its strong sympathies, church, street, community, town, local and national movements, play, which mirrors every phase of life touching the child, the sports (which rest in part on such deep-rooted instincts of human nature as rivalry and self-improvement), work, (often and early in the lives of some children) productive occupation, all these and more contribute in a more or less individual way to the life-experiences of all children. These are the experiences that come with the keenest interest and the best attention, and that leave the most vivid memories; they made life and they always perform the larger share of interpreting the lore of the schools.

Hence, too, perpetual childhood and youth are in a sense the marks of a true teacher. At least, "the teacher by grace of God" (to use Prof. O'Shea's term) is the one in whom the memory, yes, even the sense, of childhood and youth are forever fresh, strong and active. Sympathy in the teacher, in so far as it transcends the plane of mere emotional sentimentality and becomes practical in action, means power to quicken apperception in the individual.

2. *The Logical Requirement.*—The second thought which apperception should suggest in the practice of the teacher is this: Sooner or later every subject or topic comes to have its logical

pre-suppositions also in the previous instruction of the pupil, and its grasp should be left not merely to the mechanical memory, but rather to the illumination of the new parts of a subject through the related old. It would seem almost trite to state so evident a requirement, were it not for the fact that here the inertia of the teacher, in this matter of apperception, is most apt to become apparent. With the book in hand and the ready mechanical memory of childhood ever active, it is very easy for the teacher who possesses neither sense nor sympathy for the truly educative quality of his work, to be side-tracked as a mere task-master and recitation-hearer. Instruction in any real sense does not take place. If the child is instructed it is purely through his own efforts, and because the native tendencies of his mind make up in part for a lack, which is due to the inaction of his teacher. It is the business of the teacher as a true instructor, to stimulate the native associative powers of the child's mind, to make all possible essential connections between the different parts of a subject. It is, in fact, the logical connections of the phenomena or subject matter involved, as in grammar, mathematics, and the physical sciences, or the cause-and-effect connections peculiar to the sciences, geography and history, for which these subjects are chiefly taught. Their merely memorized data have not yet assumed a form worthy to be called subjects. Every subject has its peculiar purpose to subserve in human activity. This purpose determines what connections are essential among its data.

The thought of the preceding paragraph may be illustrated best by reference to the subject of arithmetic and the history of its instruction. In recent years the method of instruction has sought to reduce complexity in this subject to relative simplicity by tracing a unity of relation through all arithmetical processes. The child, for a simple example, is led to treat the addition of 2 feet and 5 feet, of $\frac{2}{8}$ and $\frac{5}{8}$, of .02 and .05, of 2 cents and 5 cents, as nearly alike as possible, by thinking the process common to each. The progressive and apperceptive feature of the method employed lies in making one known form of addition throw light upon partly new and unknown forms, and hence upon the abstracter conception of addition itself as independent of all quality. So throughout the subject one process expressed in terms of familiar concrete experiences (i. e. experiences with dollars, cents, feet, halves of objects, etc.), is made to throw light upon another process also expressed in terms of sense-experience, but not so familiar. In the end all these concrete cases give rise to an apperception of the pure process of addition. Apperception takes place first from concrete to concrete; one case illumines another of like relations. Then the element, or relation, common to all cases, the part of the process which has been constant in all cases and which has consequently contributed most extensively to mental habit, pushes into clearer consciousness and there is apperception of the universal. Now the more thoroughly this unity in mathematics is brought out by the interassociation of similar and related processes, the more nearly does the child approach to a grasp of mathematical processes *sensu stricto*, i. e., as independent of all quality—dealing purely with quantitative relations. What is all this but the completion of mathematical apperception? The recent history of instruction in arithmetic is but evidence of efforts to secure the more perfect apperceptive process. There is another problem involved in the above illustration to which we shall return later.

History and geography offer illustrations of subject matter too often reduced merely to courses of memorized facts. Let us illustrate from the former. What good teacher of U. S. history would think of presenting the events immediately preceding and during the Constitutional Convention, for and by themselves alone? By themselves they are unintelligible; for themselves they are nothing more than a refined controversy, no more worthy of the student's interest and attention than the purely local contentions of village fathers. They presuppose events that have gone before. Their adequate assimilation is dependent upon their casual association with the data of earlier instruction. For example, the crying needs which led to the call of the convention, the problems and difficulties which were projected through all its discussions and the principles and compromises ultimately expressed in the constitution, all give new point to old subject matter, such as the varying nationalities, national characters, religions and motives concerned in the early settlement of America, the geographical distribution of the colonies, together with their climatic and physiographic conditions, their social and industrial development, means of intercommunication and transportation, and their common causes and struggles, as well as their differences. Notice that this second group of facts, all of which may be supposed to have preceded those of the first group in instruction, have probably never received just this grouping before. Not only is the apperception of the individual data of the Convention dependent upon previous instruction, but their significance collectively rests upon a new grouping of the old material in a new perspective. The events of the Constitutional Convention are the occasion for this new grouping, which, where the historical resurvey has been accomplished from the new point of view (in this case that of a possible national unity) interpret, render more intelligible and significant, the events of the Convention itself. In this way the apperception of the old as well as of the new becomes more and more complete. This is review to some purpose.

3. *Interassociation of Subjects.*—After all, the differentiation of human experience into subjects or sciences is more or less arbitrary. The boundary lines between them shift as our points of view and

purposes in classification shift. In reality the classification of phenomena and their laws into special sciences is dependent rather upon a demand inherent in the logical tendencies of the human mind, than upon any definite lines of separation among either phenomena or laws. It is purely subjective. Where does the objective line lie between the phenomena and laws of physics and those of physical geography? It does not exist; the demarcation depends solely upon the point of view which the mind is taking for its own purposes.

If this is true, it follows that the apperceptive foundation which instruction must lay for any one topic will not draw its materials from any one topic, but from several. In fact, the writer is convinced that one of the commonest errors of instruction is too great exclusivism in subject matter. But this tendency to maintain fine limitations where they do not exist, defeats the best grasp of the ideas of any one science. Let us remember that it is merely the point of view which we need to maintain intact, and not the data.

Wherever, then, the forces of one subject will meet the needs of another they should enjoy abundant connections in the pupil's mind. History and Geography illustrate this. The former is dependent for some of its most essential aids in interpretation upon a knowledge of physical geography; while political geography becomes the merest memory juggling when treated independently of all history. Indeed, it is a question whether it should be separated in treatment at all from history. But let us not conceive of this possibility of interassociation between history and geography lightly. Salient, incidental, or occasional references, the one to the other, will not meet the requirement. A veritable delving in the subject of historico-geographical relations proves most fruitful to interest and apperception in instruction. In fact, one almost finds a new subject developing. The geographic method, furthermore, has long been a part of the method of historical interpretation. The teacher of the future will find a most interesting study of this kind in the historical events of the past three years and, evidently, of the years immediately before us. They will constitute a new epoch in American history, whatever the ultimate administrative policy. But mark how physical, social, industrial and commercial geography have been making history for us, and how extensively their data will be required in all future instruction upon the history of this epoch.

In the same way the physical and biological sciences and mathematics are more or less interdependent; an adequate grasp of any principle belonging to one of them almost inevitably involves ideas from the others. Do we not hear the teachers of biologic science in our secondary schools calling for a training in the physical sciences as a preparation of their students for their own, and the teachers of physical science demanding more and better training in mathematics? Such demands might be multiplied indefinitely; but in the end we shall all have to yield a little of the special point of view, co-operate in securing as favorable an arrangement of the different subjects in the curriculum as possible (for no one curriculum can meet all such demands) and then devote ourselves to a little more pedagogical skill in the instruction of the classes for which we are responsible. This skill calls, among other things, for the liberal employment of all subjects, wherever they may fitly assist in the interpretation of any one thought.

4. *The Bearings of Interest.*--The doctrine of interest is usually regarded as a more or less independent principle in teaching. At least, discussions tend so to emphasize it. Yet we shall find it fundamentally involved in all apperception. The two are interdependent. The "point of contact in instruction" is the point at which focus both keenest interest and an active fund of fitting ideas. Graze some center or complex of well associated ideas in the individual and it will always be found responsive and aglow with interest. It is by virtue of interest that we persist long and intensively enough in thought or experience with any object to secure a fund of well-associated ideas about it. Conversely, the well-associated complex of ideas intensifies its interests, and irradiates interest from one center to another, from itself to other fields. Our principle here, therefore, is a double one. Interest is a condition of all forms of apperception; it is also an outgrowth of apperception, and its growth is, in a measure, the test of efficient instruction.

The principle of interest is so constantly implicit in every other section of this article that it is hardly necessary to emphasize it further here. We may conclude with the proposition that the instructor should not only seek to utilize the native and the acquired, the individual and the common lines of interest, but to develop interests, as conditions of apperception.

5. *The Condition of Unconscious Growth.*—Perhaps we need to recover from the notion, if this discussion has thus far tended to beget it, that the process of assimilation is one, either which we can consciously and fully control, or which is dependent merely or chiefly upon the conscious processes which we stimulate in instruction. Despite all the light our skill can throw upon matters of instruction, there can be little doubt that, for the most part, assimilation is taking place even more out of the class-room than within; and as much unconsciously as consciously. We must continue to throw what light we can; if its rays can be projected so as to penetrate and influence the hours of consciousness outside of the class-room, or even those of unconsciousness, so much the better.

At the close of section two we have already made some reference to the fact that all new subject matter not only rests upon the old in its acquisition, but is retroactive. It reillumines the old. The illustrations drawn from history and geography, and from arithmetic, which appear in section two, point this truth.

But so does life react upon the effects of instruction. Thus the young American, filled, as he thinks, with the spirit of his native country and its institutions, and glorying in his mastery of its ideals, means, resources, purposes, goes abroad to learn of European life. What his youth in America gave him of experience and knowledge are called into action in the grasp of the new. He returns, and behold! he sees his fatherland with other eyes. Unconsciously, a process of assimilation has been going on, which he now finds is traceable to comparison with European impressions; yet the comparison was not consciously undertaken. He now finds new thoughts, seemingly already matured, spontaneously suggested by everything he sees at home; he has a better appreciation, a better understanding of American life. Yet this illustration presents a very common phase of growth—increase of mental stature in part by the unconscious processes of organization. Is there not, here, a very essential, yet unconscious, reaction of the old upon the new, resulting in assimilation, or, if you please, apperception? Often it is more thorough and fundamental in its effects than the conscious.

To what, now, is this unconscious process of assimilation due? From the very nature of the case (the difficulty of fathoming brain processes which are largely without any conscious concomitant) we cannot go very far in answering this question. But unconscious assimilation, which constantly adds to the significance of all mental acquisitions, remains, nevertheless, a fact which conditions education. We must consider it in order rightly to gauge the full ultimate value of any conscious educative process. There is one principle which modern psychology and educational experience have unquestionably shown to be involved in this unconscious increase of significance and force in one's mental furnishings. "*Life*" itself puts this principle in its broadest terms; but life is essentially action, occupation. Action, then, or occupation, may be accepted as a pedagogical principle which operates for the completed assimilation of consciously acquired ideas. Largely, without immediate consciousness of all the ideas which determine our action, conscious often of but the one idea which constitutes our aim, a great complex of ideas nevertheless enters into the inhibitive and selective processes of the brain to determine action; and in the end they are reacted upon by association with those new experiences which only rationally directed occupation can give. Occupation is, therefore, not alone a muscular training in skill, accuracy and rapidity of execution; it is also a constantly new interpretation or apperception of ideas, both of those directly and consciously brought to bear upon the purpose of the occupation, and the great mass indirectly and unconsciously implicated. Occupation *is*, relatively, completed apperception. Herbart opened the way to this thought in his last step of the instruction movement, which recent writers have called application; but which is better termed, in his own words, "function." This is in part the idea which shapes Dewey's pioneer school at the University of Chicago, and of his recent publication, "The School and Society."

Now, without expressing any preference for any school, system of pedagogy, or movement, in which this principle may have received some definite form, we may at least claim for it some sort of rational recognition in practice. The principle of selective and executive occupation, or of functioning knowledge, as a means of completing apperception, is already in the school. The future will see it recognized in a larger and completer way. Language exercises, in the service of historical, literary and scientific studies, are a partial answer to this question. The whole problem of interrelating subjects of instruction is a partial answer to it—in so far as one problem may be an answer to another. Manual training, including the occupations of the Kindergarten, is a partial answer. But in the largest sense, perhaps, those occupations which employ the body in its highest and most delicate muscular facilities, to ends which are vital to the actual daily needs of human life, but without losing sight of the ideal and æsthetic functions of society, offer, perhaps, the grandest vision of an answer. Practically, the answer is a matter for the consideration of every individual teacher who knows her conditions of work and their limitations. Every teacher can surely employ occupation in some form, as an avenue to completer apperception. This is only one of the educational values of constructive and executive occupation, but it is a fundamental one. At all events, it is well worth the teacher's while to put the efforts at instruction into close touch with the fields of human action, for the latter are always vital to growth in interests and intellectual stature.

Social or human intercourse, both real and ideal, are very closely related to the principle of occupation in this matter of sub conscious growth. If we can control the character of this intercourse, we can control a great deal of what enters into subconscious mental assimilation. To cast about the child only the moral and ideal social elements of environment; to bring him in contact with the good and beautiful in art; to introduce him to the ideal social and human relations of literature, is to do far more than to amuse him, or even to cultivate interests and tastes and habits; this intercourse results in a perpetual and persistent reaction upon his fund of ideas and experiences. Not a thousandth part of this reaction is voluntary or conscious. Elements are subconsciously felt and drawn into the mental organization, which may make or mar character, but which are long without apparent expression. For the sake, then, not only of tastes and interests, but also of mental attitudes, habitual modes of thought, and the slowly but vigorously developing ideas—all of which are but phases of the problem of apperception—it becomes the business of education to control further and select both the ideal companionships of the child, as in literature and his real intercourse with human life. He shall be "known by the company he keeps," because this company, first of all, teaches him its ways of knowing.

6. *The Genetic Condition:* Already, in noting the unconscious effects of increasing maturity upon the knowledge imparted by conscious educational measures, we have come very close to the most difficult problem which educational work now has to face, the genetic problem. Here, again, modesty should compel us to admit that we do not know very much concerning successive phases of development in the child. We look to future studies of childhood and youth to make our knowledge much more accurate and definite. At least, some progress is vouchsafed in recognizing the problem; and in a very broad way we are able to trace the effects which certain more or less instinctive periods of development have upon the interests of the child, and to see that the stage of intellectual advancement affects very materially the character and quality of apperceptive processes. We can trace these influences much more definitely than formerly. But a few illustrations bearing upon the problems of apperception can be undertaken here; the literature of child-psychology must become the recourse of the teacher who would get very far into this problem.

In general, our new formulation of the principle of apperception from the genetic point of view would be about as follows: At certain stages in the child's development, new interests appear quite spontaneously, accompanied by instinctive forms of action and heightened receptivity for their corresponding ideas. The efforts of the teacher to further apperception in instruction will utilize their related lines of action and thought, at least in so far as they are fitting to the child's growth. The majority of them are fitting, for they are the product of natural selection in the adaptation of the human species, and hence either have a direct bearing on present human action or constitute stages of development which condition the child's growth into full maturity. While they are mainsprings of activity in the child, they are still very amenable to modification through the environment, including educative processes, for, with the exception of a few complex reflexes, such as swallowing, sucking, crying, essential to the life of the infant, most of the instincts have lost the definiteness which characterizes animal instincts. Hence, as strong and dominant tendencies, though somewhat vague in content, they may be regarded as renewals of educational opportunity.

Play is, perhaps, the best illustration of this thought. It is instinctive, strong, and vital in every healthy child, a means of mental growth and grasp, and the child's test of the values of all the objects and actions he experiences; yet it is relatively without definite inherited content, such as characterizes the nest-building instinct of the bird. The content of play is furnished by imitation from the child's peculiar social and natural environment; play is the child's mode of apperceiving his environment. The Kindergarten utilizes it, among other things, to secure just this apperception of experiences, which it believes to be peculiarly in sympathy with child life. The grades should use it as well.

A little later the innate spirit of rivalry, ripening though social competition, introduces a new element into the play of the child and produces the competitive and heroic sports. This, again, is educational opportunity. The heroic in literature and history should now furnish the sympathetic materials for the ethical ideals, at the same time that the play-ground is giving daily discipline to the social personality. In fact, is there any good and sufficient reason why refined rivalry and an ethical competition should not become mainsprings of action in the class-room as well?

We do not presume to have exhausted the important pedagogical problems which the broad principal of apperception may suggest to the teacher for reflective practice. The outcome of the discussion, in general, is (1) an emphasis of the fact that practically we have to do not with one, but with many problems of instruction; (2) that the teachers full appreciation of the theory, either as stated in general, or as it shapes itself in the form of the many concrete problems, is dependent upon the power of what we have termed "reflective," i. e. self-critical, practice; (3) that teaching must have full reckoning with the pupil's individual experiences, (4) with those connections or interassociations of subjects and parts of subjects which are mutually interpretative, (5) with interests, both native and acquired, (6) with the maturing process of unconscious mental growth, especially through life and occupation, and (7) with all the genetic data of human development, as the successive instinctive forces and their concomitant forms of interest, thought and action.

Ruling Principles In Method.

By A. H. Garlick, London, England, Author of "Manual of Methods," "Psychology in the School-Room," etc.

TEACHING is an art, and like all arts it is based on science. Certain ruling or guiding principles are laid down by the science, and these principles should regulate practice as laid down by the art. Hence we get method. Principles are invariable; methods variable. The principles are few; the methods many. The difficulty is to find the right method for each case. This difficulty is a real one, but owing to the impetus given to the study of pedagogy in recent years, it is a decreasing one.

Now our methods of teaching may be arrived at in various ways. They may be discovered experimentally, or they may be deduced psychologically. The former is the Inductive or Practical source; the latter is the Deductive or Theoretical source. Both are good, and both are capable of improvement. Combined, they mutually improve each other. The empirical is rectified by principles; the principles are corrected by experience. It is essential to remember this, for the teacher's method must be based on principles.

One great leading central principle should be regarded as a sound basis for the education of early childhood and several ruling principles group themselves round this main trunk as offshoots, or branches of it.

The following analysis will help to explain this:

ANALYSIS.

A.—RULING PRINCIPLES IN METHOD.

Method should arrange for the harmonious and complete development of the whole of a child's faculties. *This is the great ruling principle.*

I.—There should be in our methods a recognition of the spontaneous activity of children, and the proper stimulation of this activity in certain well-defined directions.

1.—Methods of Teaching must rely mainly on interest.

2.—Method should provide both for Mental Growth and Development.

a. Growth is obtained through sense-training.

b. Development is favored by the cultivation of the higher faculties.

II.—The Sequence of Teaching must be observed.
III.—There should be the Association of one Lesson with another through some leading idea or ideas.
IV.—Method should possess Force and Local color.

B.—MANNER IN METHOD.

METHOD SHOULD ARRANGE FOR THE HARMONIOUS AND COMPLETE DEVELOPMENT OF THE WHOLE OF A CHILD'S FACULTIES.—Our methods must follow the methods of nature, and be based on them. They must correspond with the historic methods by which mankind has been educated and developed. There will be then a greater aptitude to acquire knowledge on the part of the children.

This principle requires that the teacher shall pay especial regard to the love of movement; to the observant use of the organs of sense, and especially sight and touch; and to that eager desire of questioning which most children exhibit. All of these should be encouraged under due limitations, and should be developed simultaneously, so that each stage of development may be complete in itself.

I.—THERE SHOULD BE A RECOGNITION OF THE SPONTANEOUS ACTIVITY OF CHILDREN, AND THE PROPER STIMULATION OF THIS ACTIVITY BY THE TEACHER IN CERTAIN WELL-DEFINED DIRECTIONS.—The spontaneous activity to which children are prone is simply the pursuit of those pleasures which the healthful exercise of the faculties gives. The pleasure of activity is nothing more than the pleasure of power, for the consciousness of activity is the consciousness of power. This feeling of power is especially gratified in the overcoming of a difficulty. *Hence, method should allow for difficulties.* The pleasure, as a rule, is proportional to the greatness of the effect compared with the smallness of the exertion. This principle now receives a wide recognition in most of our schools. Such subjects as Writing, Drawing, Reading, Recitation, Spelling, Arithmetic, Singing, Drill have long recognized this principle, although in early days, probably more from chance than knowledge. Now we find kindergarten and its developments, such as varied Occupations, Manual Training, together with Object Lessons reinforcing this principle in the curriculum of our schools. It is a ruling principle, and it now rules our methods in the teaching of all subjects.

1.—METHODS OF TEACHING MUST RELY MAINLY ON INTEREST.—Curosity and Interest are inseparable. The one never appears without the other; in fact, the one implies the other.

Now Curosity is one of the chief springs to intelligence. It is one of nature's provisions for extending our range of knowledge. It is to the mind, what appetite is to the body. It arises from the restless activity of children, and as a result every normal child is more or less disposed to it.

The teacher must rely mainly on Interest in teaching for the following reasons:

1. Young children have little will power, and so are incapable of prolonged effort.
2. Young children have fairly developed powers of feeling, and it is easier to excite their feelings (by interesting them), than to stir their wills (by trying to force effort).
3. "Whatever does not interest the mind, that the mind is indifferent to, and whatever it is indifferent to, is, to that mind as if it had no existence."

Right methods produce interest, because they fit the teaching to the class, stimulate mental activity, and promote mental development.

Take the case of two teachers. Each wishes to teach the general truth that air presses upwards.

One teacher tells the class the fact and then proceeds to illustrate it.

The other commences by filling a tumbler with water, putting a piece of cardboard on the top, and inverting the tumbler and card. The children wonder at the result, and are curious to know why the water does not run out.

Relatively, the first teacher has stifled curiosity, and probably failed to arouse much (if any) interest. The second teacher has stimulated curiosity, and interest follows in its train.

If our methods are to be suitable, they must be neither too hard nor too easy. They must recognize that there must be a certain amount of similarity between the present and the past ideas of the child.

A lesson is *too hard* where the child has no ideas capable of recall, which are sufficiently like present ideas to arouse interest.

It is *too easy* when it presents trains of ideas exactly or mainly like trains of ideas already existing in the mind, e. g.

A lesson showing that decimal fractions are really only an expansion of our ordinary system of notation would be very interesting to a child of eleven, who had a good idea of the notation of whole numbers, and some knowledge of vulgar fractions. It would be very uninteresting to a child of six struggling with the difficulties of the notation of *thirteen* and *thirty*.

2—METHOD SHOULD PROVIDE BOTH FOR MENTAL GROWTH AND DEVELOPMENT.—Mental growth means an increase in the stock of mental materials; mental development means the elaboration of those materials into more complex forms. Sensation and Perception favor mental growth; Imagination, Judgment and Reasoning favor mental development. The mind grows through instruction; it develops through education.

Our methods of teaching, then, must allow for sense-training, by means of which our supply of materials for mental operation is obtained. They must also train the higher faculties of the mind, because these are the mental agents for working up the materials into new forms.

3—RIGHT METHODS DEVELOP AND TRAIN THE LENSES—There is no need to labor this point. It is now generally admitted that accurate sense-perceptions are the best preliminaries to accurate reasoning; that perception must be trained before conception. It will be sufficient to remind the reader that:

a Contact with objects is a prime necessity in sense-training.

b The senses should be trained in the order of their development, r. e.

Special attention should be paid to the senses of sight and touch.

c As many senses should be appealed to as possible, e. g.

In a lesson on Copper, the child *looks* at the color of the metal, *feels* it, *bends* it, puts the *tongue* to it, *strikes* it, &c., and so there is an appeal to several senses.

d The Senses should be trained in proportion to their intellectual importance, 2 e.

Sight and Touch, the most intellectual senses, should be trained more than the others.

Of course, there must be proportion in all this. Sense training must be neither over-specialized, too prolonged, nor too exclusive.

4—OUR METHODS MUST TRAIN THE HIGHER FACULTIES OF THE MIND—Most children are more or less *imaginative.* Aided by imagination, the child's natural activity seems to overflow to inanimate objects and to endow them with life. Children's toys and games daily reveal this. Some of the apparently farfetched resemblances of the kindergarten are very real to the child. We must not crush this delight. We must develop, regulate, and guide the fancy, for the pleasures of the imagination are one of the chronic delights of the race.

Kindergarten occupations, History, Geography, and Literature are among the well recognized means of training at the disposal of the teacher.

The importance of educating the *judgment* is recognized by every system of education which is rational. The teachers must seek the causes of the incorrect judgments of his pupils and his methods of teaching must not only war against them, but also seek to prevent them. Briefly these causes may be defined as.

1. Lack of clear ideas.

   Clearness of concepts, images, and percepts is the remedy.

2. Lack of time to examine ideas.

   Children must not be allowed to jump at conclusions.

3. Appropriating without due examination the words of other people.

   This is a difficulty. There is a primitive disposition to believe the words of others. The teacher's method must seek to regulate this disposition, and not to destroy it, because it is one of the mainsprings of faith, belief, and obedience.

4. The bias of feeling.

   Another difficulty; for the wish is often father to the thought.

School life is rich in opportunities for training the Judgment. Writing, Drawing, Manual Training exercises, problems in arithmetic, and sentence-making all afford opportunities for this training.

The outward and visible sign of a judgment is a sentence. Hence sentence-making becomes a valuable adjunct in the training of the judgment. For this reason all answers should be given in complete sentences.

In training the *reasoning* faculty, the teacher may proceed by way of Induction or Deduction. A comparison of these two great forms of reasoning will be useful.

INDUCTION.	DEDUCTION.
Data.	Data.
Iron expands with heat.	All solids expand with heat.
Brass expands with heat.	Iron is a solid.
Lead expands with heat.	
Glass expands with heat, &c., &c.	
INFERENCE.	INFERENCE.
Solids expand with heat.	Iron expands with heat.

Now let the two methods be compared in relation to teaching.

INDUCTION.	DEDUCTION.
1. Is the method of *education*.	1. Is the method of *instruction*.
2. *Is slow*. All knowledge has to be acquired first hand by the observation of particular cases.	2. *Is quicker*. The child avails himself of knowledge others have acquired.
3. *Is a natural method*. It is from the particular to the general. The true order is percepts, concepts, judgments.	3. *Is not a natural method*. Judgments are put before concepts, concepts before percepts, theories before facts.
4. *Is a sure method*. The general law is arrived at little by little. Its meaning is well grasped and it can then be accurately applied to new cases.	4. *Is not a sure method*. Many general laws are too difficult for children to understand when presented to them by this method. The children may have learned the words, but may not have grasped the ideas; hence there is faulty application to new cases.
5. *Is a method which fosters self-reliance*. It leads children to depend on their own acts of perception, conception, and judgment. It is the method for self-development.	5. *Is a method which encourages dependence on others*. Where possible all method should encourage self-development. This method does little or nothing in that respect.

II.—THE SEQUENCE OF TEACHING MUST BE OBSERVED.—The faculties develop in a certain order. Certain kinds of knowledge are requisite for the proper development of each faculty. The psychologist has determined this order or sequence, and it is the teacher's duty to follow it in his methods of teaching.

This sequence and the principles it lays down are now well known to most teachers, so that under the circumstances it will be sufficient merely to name them. The first two are considered to be fundamental. The rest are more or less modifications or applications of these two. They are variously known and described as—

a From the Simple to the Complex.
b From the Concrete to the Abstract, or
  From the Particular to the General.
c From the Indefinite to the Definite, or
  From the Unqualified to the Qualified,
d From the Physical to the Mental, or
  From the Corporeal to the Incorporeal.
e From the Empirical to the Rational.

Perhaps all of these may be more or less correctly described by the principle of proceeding *from the known to the unknown*, which is really an application of the law of similarity. Our methods should embrace both similarity and contiguity, but only when similarity is inapplicable should there be a resort to contiguity. Association by contiguity is the first resource of the weak teacher, the last resource of the strong one. Let us illustrate by two examples:

One teacher, in dealing with the lengths of the diameter and of the circumference of the earth, would write on the blackboard :

Diameter of earth	8,000 miles.
Circumference of earth	25,000 miles.

thus associating the two truths by contiguity.

Another teacher would take a hoop and let the children measure the diameter and circumference with string, and discover that the circumference is a little more than three times the diameter. He would repeat with ball, &c, He would then proceed step by step somewhat as follows:

(*a*) In a ball the circumference is a little more than three times the diameter.

(*b*) The diameter of the earth is 8,000 miles.

(*c*) Then because the earth is like a ball in shape its circumference must be about 25,000 miles.

The second method is better than the first for the following reasons (among others):

1. Operation (*a*) leads to active observation on the part of the children.

Result (*c*) was arrived at by the working of the law of similarity.

III.—THERE SHOULD BE THE ASSOCIATION OF ONE LESSON WITH ANOTHER THROUGH SOME ONE LEADING IDEA OR IDEAS.—This is the chief consideration which underlies true methods of teaching in early childhood, *e. g.*, take a lesson on a domestic animal.

Object Lesson for general study of its structure.

Reading Lesson for knowledge of its habits and character.

Drawing Lesson
Kindergarten Lesson } for exact knowledge of form.
(pricking out line.)

Singing Lesson, school songs bearing on its associations with human life.

Composition Lesson, oral or written.

Arithmetic Lesson. Arithmetical examples may be built up on it and around it.

Geography Lesson. The native home of the animal. Physical environment compared with present.

This association favors right methods, and so conduces to elasticity, variety and interest, *e. g.:*

Reading becomes a kindergarten lesson through pictures and word-building.

Writing becomes a variety of kindergarten drawing.

Arithmetic. Elementary exercises in number are associated with many of the kindergarten occupations.

This principle embodies the logical branch of education—an inquiry into the proper or natural order of the different subjects grounded on their relative simplicity or complexity, and their mutual dependence, *e. g.:*

Arithmetic before Algebra.
Geometry before Trigonometry.
Inorganic before Organic Chemistry.

IV.—METHODS SHOULD POSSESS FORCE AND LOCAL COLOR.—Just as the chief excellence of modern teaching is the careful and intelligent direction of the steps of reasoning, so some of the chief defects are a want of force and a want of local color. By local color is meant especially illustrations from the life and surroundings of the scholars.

Now any method possessing these qualities must necessarily be varied to suit local circumstances. An example will illustrate this:

> The girls in a certain town school were receiving their first lessons in stocks. As usual, a fair percentage of the class failed to grasp the full signification of such terms as *above par*, *below par*, *shares*, *consols*, &c. A school inspector suggested that the girls, the teacher and himself should set up a small business, form themselves into a meeting and take shares. Interest was at once aroused, attention was riveted and understanding followed.

B.—MANNER IN METHOD.—This article has run out to such lengths that only a few words may be said on this point. It is well for the teacher to remember that he cannot separate himself from his methods. He is part of them, for teaching includes practice as well as precept. The "personal equation" will make or mar any good method. The tool may be an excellent one, but if the workman is ignorant of its use he may do more harm than good with it. "Tact" is the chief essential. It is the oil which makes the school machine run smoothly. It demands mental alertness, ample knowledge, constant preparation, quick sympathies, a full enthusiasm, a cheerful temper, a pleasant manner and an endless stock of patience, because the best results of teaching come slowly. We all know what a teacher should be—the world demands a high ideal—and we should see that we strive to reach that ideal.

The General Object Of School Instruction.

By CHARLES F. REIGART, Principal, Ethical Culture Schools, New York City.

THE aim of instruction is determined by the aim of education. For, though formal instruction is only a part of the process of education, it should be an organic part. In the teaching of any lesson it is unsafe to ignore final aims. Only through a definite and comprehensive purpose can all the educational influences under the control of the teacher be effectively organized. Individual and social ideals, physical and moral, as well as intellectual ends should be kept in mind, though the immediate object of instruction is mainly intellectual. Indeed, the merely intellectual result cannot be completely secured without constant attention to physical, emotional, and ethical considerations. The attempt to base instruction upon the most fundamental emotional activities of childhood and the introduction of manual training would be justified even if intellectual development were the sole object of education.

Formal instruction is always, to some extent artificial, and may even check the spontaneous process of education which is well under way previous to school life. The child left to himself multiplies and organizes his experiences in his own way. Much shrewdness and much ability to take care of one's self may be developed unaided (witness the newsboys and bootblacks of city streets), but this type of activity is for immediate purposes only, and lacks the power of progressive adaptation to more complex situations. By means of formal instruction it is possible to enlarge and organize experiences, to widen interests, to clarify the moral ideas, to extend the power of action. The object of instruction is to enlarge the environment of the child by means of literature, history, art, mathematics, nature study and occupations; to arouse appreciation for all that is most worthy; to develop power to analyze experiences and to unify them through imagination and generalization; to substitute remote for immediate ends, and to cultivate the power to plan and act rationally.

Instruction is a process which requires two agents. Unless the pupil responds, unless some reaction takes place, the teacher teaches in vain. The material of instruction for each child is really not what the teacher says or does, but what he himself sees or feels, or thinks or does, in response to suggestion. It is, therefore, a matter of supreme importance, the kind of reaction that is brought about. Granted that the teacher has high educational ideals and a clear conception of the purpose of instruction, that subject matter is well chosen and lessons are well planned, the method of lessons will be further modified by the character of the reaction expected from the pupil.

The reaction should be complete. It is not sufficient to aim only at some motor reaction, such as a verbal repetition or a manual construction. Words may be empty of meaning, and so may the work of the hand. Verbal or manual reactions have educational value only as they are the expression of thought and feeling.

The reaction should be appropriate and natural. Repression does not create favorable conditions for appropriate reactions, nor does over-excitation. To encourage a child to speak or act before he thinks, is as grave an error as to allow no opportunity for expression. Too often pupils are urged to express what is not in their minds. Further, what is in the mind cannot at all times be put into some form of expression upon demand. A story may be effective though it is not at once retold; a picture may tend to refine the feelings though no attempt is made to reproduce it; a poem may be appreciated though unexplained. In many cases the really appropriate motor response should not be extorted, but should be looked for in the expression and attitude of the pupils and in subsequent character reactions.

Reactions should be organized. The character of instruction must be largely determined by the fact that a high degree of power, intellectual, moral or practical, depends upon the ability to see relations, to master complex situations, to plan and execute a series of actions. The ultimate object of all teaching should be intelligent adaptability rather than special skill; wisdom rather than learning.

The field of instruction is limited indeed if its influence is confined to the brief period during which the child is in the schoolroom. The school cannot effectively "prepare for life" in the sense that it can "furnish the mind," or round out the emotions, or complete the judgment, or organize all activities into settled character. Formal instruction cannot complete an education, but it can aim to make a good beginning, to bring the child into real contact with life and to fortify him for the life-long struggle for mastery of the world and of self.

Inductive And Deductive Methods.

By JOSEPH H. WADE, Principal, New York City.

FROM a horizontal support suspend several balls of different metals, the balls being one inch in diameter. Procure or make a ring with a diameter slightly larger than one inch. Show the class that the balls will severally just pass through this ring. Now heat the balls by means of an alcohol lamp or a gas jet and the class will see that they cannot be passed through the ring. The pupils will immediately conclude that the increase in size of the different balls must be due to the application of heat. Again the teacher may take several pieces of wire of different metals. Apply heat and show that the effect has been to increase the length of the wires. From these or similar experiments the pupils will easily reach the generalization that heat expands metals. Of course the experiments have been performed with only a few metals but the pupils will feel none the less confident of the truth of their conclusion.

The teacher by proper questions can bring out the fact that the pupils have previously observed the heating of iron tires by wheelwrights in order to make them fit, or the spaces left between the rails of the railroad track to allow for expansion in hot weather. The teacher may add several interesting facts of a similar nature, facts beyond the sphere of the pupils' observations.

Again the class may be shown a bottle with a glass stopper, the stopper removed and slightly heated, and the pupils will see that it cannot be again placed in the neck of the bottle or at least not until it has cooled. Or the teacher may fill a bladder or thin rubber bag with air or gas, expose it to heated air, and the result will be the bursting of the bladder or bag. The class will see that the expansion of the glass stopper and of the air or gas was due to the application of heat.

In this way the general principal of Physics, that heat expands bodies, will be reached and enunciated and the observations of pupils, or facts recounted by the teacher will impress the applications of the law.

The above process of simple experiment and familiar observation is usually followed by teachers in their elementary science work and illustrates the method of induction in a subject where inductive methods are preeminently applicable. By a similar series of experiments more or less extended, the teacher develops one after another the underlying principles of physics. But he does not stop here. As each principle is formulated he questions the pupils as to their observation of its practical applications and propounds problems which the pupils will solve through the principles already learned.

Now what is the educative value of this process? In the first place to a great extent the pupil has taught himself. Instead of learning principles from a book or accepting them as the dicta of his teacher he has induced them by the application of his own powers of observation, analysis, comparison and judgment, and his generalizations are founded on his own perceptions. In this method of discovery, he is following the natural order of mental growth, and the training thereby acquired is possibly more valuable than the knowledge obtained.

This method of teaching by experiment and observation is the one almost exclusively followed at present by writers of text books on Physics. I have at hand a manual of Physics intended for elementary school work and published some years ago. In this book the different principles are stated at the beginning of the chapters and are followed in each case by descriptions of possible experiments and practical applications.

The former method may seem slower but it is sure, and certainly none will deny that its effect is to make the pupil self-reliant and incidentally to afford him a valuable training of his reasoning power. The second method may be quicker, and the pupil learning by heart the principles involved has the fruit of the experiments and observations of ages, but incidentally he has acquired a habit of dependency on others, has lost the valuable training of his own powers of observation, and has reversed the natural order of development by beginning with concepts and verifying the same through percepts.

Not alone in Physics, however, has the process of using the child's experience to develop generalization been adapted to elementary education. In the other subjects of the curriculum teachers are developing principles, instead of stating them at the outset and impressing them by numerous applications and corollaries. Text books are following this order, and courses of studies are founded on it. It is the great method of proceeding from particulars to generals, and from these generals back to the particulars. It is going from the concrete to the abstract, from the known and experienced to the unknown. It is the method of Spencer, Payne, Tompkins and De Garmo and it has served as the basis of most of the improved methods in elementary education that the great educational reformers of the past were tending to in their writings and experiments.

As to a term for this method it has been called the Inductive-Deductive by some, the Complete by other writers. It is neither entirely inductive nor entirely deductive but partakes of the nature of each process in its application. It is inductive inasmuch as the pupils are led to induce or develop a general proposition or truth from the examination of particular cases. It is deductive because the pupils are led to follow out this general proposition into particular applications, to find this general truth manifesting itself under a variety of forms. In fact these two methods are so intimately related and connected in teaching processes that it seems absurd to say that this subject is to be taught purely inductively and that subject purely deductively.

Before we discuss the application of these methods in special subjects let us glance at their educational values in general methods. Of the many definitions of induction and deduction I take the following from Sully as specially clear:

"Induction is the process of mentally reaching a general truth or principle by an examination and comparison of facts. Deduction is the process of applying the truth thus reached to some particular case."

In subjects where the observation and comparison of objects and facts and the development of the underlying principles from the child's own experiences are possible, inductive methods are specially prominent.

Many subjects which were formally presented deductively are now introduced by inductive processes. Thus Grammar, which the text-books formerly presented with an arrangement of definitions followed by a limited number of illustrations, is now introduced through the language lessons and the natural order of acquirement is followed. All elementary science teaching is largely inductive, with experiments in Physics, and observation and classifications in Nature Study, Botany and Zoology. So in Geography; the principles and definitions of Physical Geography should be acquired inductively whenever possible. Even in History and Arithmetic the experience, knowledge and observation of pupils should be used.

As intimated above, this inductive process is of special educational value because it proceeds along the lines of the pupil's natural development, the historical growth of the race. It begins with percepts and induces concepts, and it uses the senses as a means for laying foundations for future reasonings instead of giving the results of such reasonings, and then bringing in sense perception for illustrative purposes.

But while the inductive process is the natural one, it is none the less necessary for the teacher to prepare the work, to arrange the facts to be presented, and to secure suitable objects and illustrations. The observations of the children must be methodical, thorough and accurate, or the results will be dissipated. In Geography and all elementary science work, the search for causes must be a definite purpose in the mind of the teacher as a means of strengthening the reasoning powers of the pupils.

The use of the apperceptive faculties of the child is so closely allied to the use of inductive methods that one cannot be employed without the development of the other. As apperception includes under a common general predicate the related familiar subjects acquired already by the child, the teacher in his preparation can by proper inductive methods lead to the fullest presentation of the law or principle underlying the mass of facts.

We all recognize how necessary is the choice of proper method wholes to the proper planning of the work of instruction, but sometimes teachers fail to grasp the full force of the method whole by neglecting inductive processes. Through all the facts, examples and materials which we arrange under a method whole must run the essential law or definition or principle of classification or moral truth, which we are to develop as the essential abstraction, and then the deductive method will demand a wide and intelligent application of this definition or principle to cases, examples and facts.

In all this examination of individuals leading to generalizations, we must recognize the fact that no pupil will examine all possible cases, and hence that the general will always be to some extent a leap in the dark, and the teacher will therefore guard against hasty inferences or careless generalizations. Of this Prof. McMurray says, that "one of the great ends of culture is to gradually transform this careless, unconscious, inductive tendency in children into the painstaking and exact scrutiny of the student and later of the specialist."

This inductive process is always an unconscious search for the similarities or uniformities that exist in a mass of individuals, and this training to discriminate between the accidental and the essential is certainly in itself one of the most valuable means of child training at hand.

Some writers have discussed these methods of induction and deduction under the titles of analytic and synthetic methods. They agree, however, in the vital point, which is, that the analytic or inductive is the most useful in the acquiring of new knowledge and the most valuable in the training of the child's natural faculties, and the synthetic in applying that knowledge. They further agree that the complete method comprises both analytic and synthetic, that whereas one leads to new discoveries, the other gives the result of these discoveries in the application of the generalizations.

And now having discussed these inductive and deductive processes in their relations to the essentials of general methods, let us glance at their use in the teaching of the special subjects of the elementary curriculum. In English Grammar more than in any other subject has the use of inductive processes progressed in the last few years. Whereas in the past the text-books began with definitions of the parts of speech followed by a few examples, then definitions of classes and general principles of inflection and conjugations followed by more or less extended exemplifications, we now have the grammar of the language lesson. But in casting aside the former we have not always succeeded in the substitution of proper material in the latter. Sometimes the mass of examples is lacking in the arrangement and choice necessary to bring out clearly the generalization or definition, but the general movement is in the right direction, and the text-books are a great improvement on former text-books of technical grammar.

The objection has at times been made by teachers that the results of such language work are not successful for examination purposes, and that the former method was quicker. Such objectors seem to forget that the aim of teaching is not success in examinations, and experience in the new inductive methods has proved that the results are more educative and lasting. And in this subject, as in the Elementary Science work, the training in careful observation and discrimination of examples, and in the tracing of similarities and uniformities, is more valuable than the facts learned.

Instead of beginning a lesson on the noun with the definition followed by a few examples, the language lesson on the noun is founded on the principle that all definitions should be developed through sentence work. Thus, the teacher having written a number of sentences on the board, such as "John attends school," "Mary buys a book." "The river flows down hill," proceeds to develop the fact that John, school, Mary, book and hill are names of persons, places and things. Then he tells the pupils that names in Grammar are called Nouns, and with their aid form the definition, which is written on the board. The proper definition having been accepted, the pupils then apply the knowledge thus obtained in pointing out nouns in sentences given by the teacher or by themselves.

Then the adjective is taken up at another lesson. The teacher adds qualifying words to the original sentences and writes on the board, "John attends the day school," "The broad river flows down hill," "Mary buys a new book," etc. The class is asked to tell what these added words do in the sentences. When the children have explained that these words tell something of the nouns the teacher proceeds to develop the definition of the adjective. The teacher may here use and explain the word qualify, for the definition finally learned should be the most concise as well as clearest possible. Again, this generalization must be followed by well-chosen applications, both in pointing out adjectives in sentences and in forming sentences with adjectives of different classes. Following this general process all the parts of speech are discriminated, their definitions learned, and the knowledge thus obtained applied. So the classifications, inflections, comparisons, and conjugations are taught through sentences, and the knowledge thus obtained impressed by similar familiar application.

Then the syntactical rules are developed through compositions and corrections. The principles of syntax are thus acquired in the natural way through experience instead of being learned by heart, as so many of us have learned them in the past, and applied only in the correction of false syntax. In all this work, as we have remarked before, it is necessary for the teacher to keep in view the essential purpose, the definition or the principle of classification, or the rule which is to be developed from the examples given. Sometimes this is not followed so closely as it should be, and the pupils' observations, comparisons and discriminations are dissipated in the mass of examples presented.

This complete method, beginning with inductive processes, is followed not only in the teaching of technical grammar; it is the prevailing method in the first lessons in Reading to primary classes.

Not so long ago the child learned the alphabet as the first step to a knowledge of reading. He was unacquainted with written or printed words, and the letters, new in form and sound, were drilled upon for weeks, if not for months. Then he combined these letters into words, individual letter-sounds into complete word-sounds, entirely different from their components. He had come to school already familiar with the sounds of these words, and he was compelled to begin the work all over, and in the most difficult and puzzling way. Now he associates objects or pictures with words he already uses, and he learns their appearances in the printed and written forms. Then, by analysis, he proceeds from the known words to the unknown parts, the letters, and he learns to read as he learnt to speak, from experience.

In Geography also the basis of the instruction should be inductive in character. Instead of beginning with definitions of the earth and its natural divisions of land and water, the pupil is led by easy inductions to the formation of his own definitions. He is taught the points of the compass from the position of the sun in relation to his class-room. His understanding of maps is based on his drawings of plans of his class-room, the block which includes the school-house, the map of his village, or town or city; many, if not all, of which details can be supplied from his own experience. The definitions of mountains, rivers, lakes, etc., if he be a city boy, can be developed from the park hills, the drains, gutters and pools during and after a rain-storm, and then definitely impressed through the modeled map and illustrations. His knowledge of and interest in foreign countries and peoples should be based on familar articles exported from those countries. The generalizations would be in the form of completed physical or industrial maps, or general compositions. This subject, so presented, will develop the reasoning powers of the child in his search for cause and effect. The teacher will lead the pupils to discover the dependence of the industrial and commercial conditions, and often the political life of the people of a country, upon its physical geography.

In History the inductive process begins the work with stories in which the experience of the pupils are utilized in the appreciating of concrete examples of courage, and patriotism, or their reverses of cowardice or treason. These are exemplified by short stories. In this way the stories illustrative of the daring of John Smith, the self-sacrifice of Roger Williams, the patriotism of Warren, Marion, Washington, and Lincoln, the genius of Franklin and Jefferson, have a living interest to the child. But in this subject it is evidently more difficult than in the sciences to lead to proper generalizations and applications, and the work of the teacher will be to choose carefully such stories as will come within the range of the pupil's understandings.

On this point De Garmo says: "To develop true general notions concerning political or social or ethical affairs is far more difficult than to do so in the realms of mathematics and the physical universe; first, because the senses cannot be appealed to, and second, because of the infinitely more complex and entangling conditions."

In the form studies of primary grades this complete method must be followed, and the definitions of cube, pyramid, cylinder, etc., are the result of a study of the concrete objects. The teacher presents the complex individual wholes to the pupils, and then by analysis leads the class from knowledge already possessed to the generalizations or definitions, and then applies those definitions to concrete examples. I would refer to the lesson on the pyramid in "Tompkins' Philosophy of Teaching" as an excellent illustration of this inductive-deductive method, thus going from particulars to generals and then back to particulars.

As to the teaching of Arithmetic, though deduction is the general method of presenting mathematical science, yet inductive processes in developing rules are being followed to some considerable extent at the present time. In elementary schools many of the geometric principles are taught inductively through the constructional and inventional geometry of the manual training course. It is possibly fitting to remark here that when we speak of deductive methods we do not intend the formal syllogistic procedure, but rather the general idea of starting with principles and reaching particulars as conclusions. The first ideas of addition, subtraction, multiplication and division are now given through objects, the ball frame and other devices for inductive teaching. These have to a large extent superseded the chanting of the addition, multiplication and division tables. In the industrial applications the work is now presented inductively in all grades, and instead of the pupil's learning tables of weights and measures, his judgments of foot and yard, of pint, quart and gallon, of ounce and pound, are founded on the actual seeing, handling, and comparing of the objects. The relationships thus established are real to the child and not merely verbal, and the pupil who fills the quart and gallon measures with sand or water by means of pint measures, will never forget how many pints there are in a quart or quarts in a gallon.

In fractions the first ideas are given through equal parts of objects, the meaning of numerator and denominator as the number of parts taken and the number of equal parts into which the objects are divided can be actually seen. So rules of addition, subtraction, multiplication and division of fractions are induced through the child's experience in the actual drawing, dividing, superposing, etc., of lines and surfaces.

For example, the teacher may draw three lines on the board, two four inches each in length, the other two inches. These lines each may be divided into inches, and all placed in one straight line of illustrate the improper fraction of ten-fourths or the mixed number of two and two-fourths. Again, a line one foot in length may be divided into halves, another into fourths, and a third into eighths, and we can draw a straight line equal in length to the $\frac{1}{2}+\frac{3}{4}+\frac{3}{8}$ or $1\frac{3}{8}$ or $1\frac{5}{8}$ feet. So we can superpose the line of one-half foot on the line of three-quarters of a foot and show by actual illustration the remainder. In work of this kind it is well to use lines of sufficient length to show divisions clearly, and also to use different colorings. So, again, we can take the $\frac{3}{4}$ inch line twice or thrice, and in one straight line show the product. The product of fraction by fraction can be shown by the division of a surface four inches square into sixteen square inches, the shading of twelve of these squares ($\frac{3}{4}$) and then the double shading of 6 of these, showing the result of multiplying $\frac{3}{4}\times\frac{1}{2}$ or $\frac{12}{16}\times\frac{1}{2}=\frac{3}{8}$. These inductive methods in arithmetic are well illustrated in "Garlick's Manual of Methods."

The work in decimal fractions is now founded on the pupil's experience in Federal money and common fractions. In the higher business arithmetic the rules are similarly induced from the pupil's experience and previous knowledge, going from particulars to generals, and then applying these generalizations to concrete examples, as far as possible using typical examples, familiar in some respects to the child. Thus, for example, in interest, the subject may be so introduced through typical examples and founded on familiar knowledge that the rule of multiplying principal by rate per cent. will be found by the pupils themselves, and the definitions will express realities.

How To Cultivate Observation.

By Harriet H. Keith, Teacher of Methods, New York City.

IT is undeniably true that sense-perception is the basis of all knowledge of the external world, and that what is roughly termed "observation" is the *sine qua non* of the highest manifestations of mind in reason, imagination and judgment; but it is equally true that nowhere can we lay our finger upon the map of the mind, and say here perception ends and reason begins. Psychology analyzes and separates temporarily for purposes of study what in reality are inseparable. Hence pedagogy has fallen into the error of being too systematic, attempting to build one faculty upon another, instead of allowing them to grow together.

A child of eight years was shown a daffodil in which he took a deal of interest, handling it, smelling it and admiring it. A week later, a yellow tulip was given him. When shown the two flowers side by side, he said, "I see, this flower looks up, the daffodil looks down." Now, the child had *observed* the daffodil to the extent of his limited powers. It was evident that the color had been the mark of recognition. Later, the comparison with the tulip had brought out another more distinctive mark that had before been overlooked. The mere getting of visual impressons is not perceiving. The percept is made up of "marked" qualities, and only those qualities are "marked" which *comparison* causes to stand out with distinctive clearness.

Rapidity of observation comes only with experience, and with experience along particular lines or with particular classes of things. Thus, the botanist becomes a skilful judge of plants ; the geologist, of rocks and minerals ; the physician, of bodily symptoms. It is impossible to cultivate the power to observe without regard to knowledge-content. Thus, if the teacher would pave the way for a rapid and sure recognition of objects and skill in detecting real differences and resemblances between the new and the old, she must through her knowledge of the sciences present such illustrations to the pupil that he can, by drawing comparisons, discover the essential qualities of things.

Now if Classification were all there is to observation, the problem of education would reduce itself, at least so far as cultivating this faculty is concerned, to acquainting the pupil with the classifications in the different sciences. And we are only too familiar with methods of teaching based upon this ideal. It is a link in a chain of causation stretching back into the past and out into the future. We are seldom conscious of this background to all our ideas. But when we are confronted with some object strange to our experience, there are two questions we invariably ask that prove the existence of this background through the necessity for giving the idea a proper setting in it. "Where did it come from?" and "What is it for?" or "What will it do?" Cause and purpose, are as much a part of the idea of it as the present sense impressions. Remove them even partially and the mind is bewildered. A phenomenon apparently uncaused would strike the mind with astonishment. The more we know of this chain of causation and whither it tends, the better we know the object. Of course, the sense-stimulus itself may be of so strong a character as to demand attention, and although with the very young child, observation is largely of this involuntary nature, it is never wholly so. It has been shown that a young infant just old enough to use its sense of sight will not only follow with its eyes the movement of a ball swung by a cord, but will instinctively glance up the string to the hand of the person holding it. And chiefly in this lies the infinite possibility for development in the human mind. We grow in power to observe as we grow in power to react upon differences and resemblances more and more obscure. Aside from the more striking sense-stimulations that impress the mind whether it wills or not, those sense-impressions that we select as "marks" of the object are chosen in virtue of their causal significance.

No one classifies for the mere sake of classifying. It is safe to say, for example, that the botanist who first analyzed the fruit into its pericarp, carpels and seeds, had a purpose in view which was not analysis for its own sake, but a desire to understand the development of the fruit from the blossom and its purpose in nature. The questions, "How is this thing brought about?" "What are its consequences?" Were constantly before the mind of the investigator, and the result of his inquiries was summarized in the description of the fruit in general, and the classification of fruits according to those qualities which are the result of essential differences in development.

And how can it be expected that this analysis, cut out of whole cloth, and thrust upon the learner, is to cultivate his power to observe, even though it may be done with the object in hand and by tricks of questioning that presumably develop the ideas from him? Either the student is impressed with the unreasonableness and artificiality of the whole proceeding or he becomes habituated to an illogical method of observation.

Now it is undoubtedly true that it is within our power to see differences and resemblances pointed out and explained to us by another; and it is undeniable that we can see with other people's eyes to a degree that we would not like to admit, and of which we are often wholly unconscious. While such second-hand knowledge is certainly helpful in the practical affairs of life, giving us rules or forms for rapid judgment, its tendency is to destroy individuality and make us sheep-like followers of a leader, who is a leader in virtue of that very power we are surrendering. It ought to be possible to put the child in possession of his inheritance, the accumulated observations of the race, and to do so without compromising that originality which is the birth-right of every human mind. It can only be done by allowing the percept to grow in his mind under the influence of the causal interests.

This happens in every case of original observation. Try to draw from memory a familiar object—say a street-car. Those parts will appear in the drawing for which the use is known,—the platforms, steps, windows, wheels, etc. Now, if we observe an actual street car for the sake of filling out this tattered percept, examining for instance, the complicated machinery beneath the car, we will by degrees make out those parts for which we can see some use; and we name them accordingly, springs, beams, chains, etc. Not only the purpose of the parts but the way in which they are put together has to be considered. "How was it done?" and "What for?" are the mills through which each sense-impression must be drawn before it becomes a percept. If we are not very familiar with machinery, many parts will escape our notice altogether because we realize no necessity for them, and other details will bewilder us because we understand only in small measure their relation to the whole. In other words, *the strength and clearness of the percept are in direct ratio to our ability to place it as a link in the chain of causation. This means that of all the ways in which analysis into parts might be possible, that one is chosen which the reason pronounces as most serviceable to itself.*

Now, if the subject for observation be a living thing or a product of life, our questions are: "How does this thing grow?" "What was it yesterday?" "What will it be to-morrow?" "How does it act?" This is the child's natural curiosity concerning things alive, and it is the attitude of mind that makes the true student of Nature. A danger to meet in the study of living forms is the tendency to apperceive the parts along purely mechanical lines as we might an artificial object. The works of Nature are radically different from the works of man. They are not pieced together part by part. How radically wrong then is that method of study that calls for a mere dissection and naming of parts. The finding of the parts and their characteristics becomes an impossibility unless dictated by purely mechanical views of cause and effect, totally misleading.

For the purpose of studying the nature of children's interest in animals, a 1B class was shown the picture of an alpaca, and directed to ask anything they would like to know about the animal.

The alpaca was chosen because of its strange appearance, in order that the children's questions might not be suggested by any definite knowledge of the animal, They were written down verbatim as the children asked them under promise of answers to come:

What does he eat?
What is his name?
What does he catch?
Does the farmer give him anything?
Does he catch fish?
Can he jump? etc.

The interest is plainly in the animal's activities, and in their purposefulness to the animal itself and to man.

The childs natural questionings need only to be directed into more definite channels. For example, the child sees the thistle-seed floating under its downy canopy. What is this for? Why does the seed need to be carried away? How are other seeds carried away? And the door is opened to an endless number of observations. The best reasoners have always been the best observers because they have been both in one. The scientific imagination unlocks the doors of sense.

The same might be said of the artistic imagination that enables the sculptor or painter to see with truth and originality. It ought to be possible to plan a system of teaching drawing based on a study of forces, rather than upon a study of form.

In closing, two very brief concrete examples may serve, by way of contrast, to illustrate the false and the true method of cultivating the power to observe, the object studied in each case being a leaf.

Tr. "By what part of the leaf are you holding?"

Ans. "The stem"—"Yes, we will call it *the petiole.*"

"Point to the rest of the leaf."—"That is called *the blade.*"

"Run your finger around the edge of the blade. What is another name for the edge?"

"What do you see running through the blade?" "Veins, etc."

Another method;

"If we should put this plant in the dark, what would happen?"

"What does a plant need to keep its leaves fresh and green?" "Water."—"Sunlight."

"We water the roots: how does that help the leaf?"

"How does the sap get into the leaf?" "Through the veins."

"Will the veins carry the sap to every part of the leaf? How?"

"Which part of the leaf gets most sunlight?" Why?"

"Do not the leaves on this plant shade each other from the sun? Why not?" etc., etc.

The former method denies that the child is a reasoning being. It makes the teacher a huckster of information, and the child becomes too often but a receiver of husks. The latter method recognizes the fact that reason and perception are but different aspects of the same unitary mental state.

Self-Activity As A General Principle To Guide In Class Instruction.

By Edward Franklin Buchner, Professor of Analytical Psychology, School of Pedagogy, New York University.

THE teacher must awaken and employ the pupil's self-activity. Let us trace out a few facts and implications involved in this principle of self-activity, in order to justify the teacher, if possible, theoretically, and in the interest of some definite suggestions for practical purposes.

The real poverty of educational science is attested anew by two reflections concerning self-activity as a principle of all teaching. In the first place, the principle of self-activity, recognized more or less clearly in the earliest forms of thought as a controlling philosophical principle, and subjected to repeated criticisms and elaborations in modern philosophy, is very tardily recognized by those engaged in schooling. Our teachers and our lesson-makers, *i. e.*, those who write our "elements" of pedagogy, appending a few illustrative lessons, have been insisting for some years, without any fear or trembling, that the practical issues of the school-room depend upon a wide-spread application of a certain conception of self and of action. When we question the conception and the derived percepts, we soon discover that we are making appeals to the unknown. Possibly pedagogy may be uncritical, and find no real need for a standard of criticism beyond the mere attainment of results by pupils. But the ready and almost wholesale appeal to self-activity offers "the pretence of a ground or an explanation, where the ground is not understood or the explanation discovered." Such a stricture upon our current pedagogy cannot be removed by the remark that the practical aspect is the truer one. For, indeed, *principles* express manifold aspects of the nature of ourselves and of things, and they certainly cannot all be thought as "practical."

In the second place, in all forms of reflective thinking, no conception is more disturbing than that of self-activity. As an oracle of our nature, it seems to be empty, giving us no revelation of our structure and relations. The uncritical lesson-maker increases his assurance that the child is "active" in muscles and in ideas, and leads the teacher to seize upon those gross aspects of psycho-physical development that can be somehow managed into yielding results. In other words, the "self-activity" sought after as the very foundations of experience by those who make our philosophical systems, and by those who analyze our consciousness, is not the "self-activity" spoken of without any embarrassment by the lesson-makers.

Self-activity is a complex and highly derived conception. Whatever may be the meaning we put into it, it has descriptive reference to a specific kind of action. This reference is emphasized when we contrast with it other kinds of action. Energy and resistance are types of behavior markedly impersonal. Spontaneity represents the source of origination of the activity, rather than its specific quality. Independence of action renders emphatic the objective relations in which the activity is placed. These forms of behavior are characteristic of things particularly. In its pedagogical uses, self-activity carries reference to psychological processes more or less allied, in our common thought, to the emotional sense of power, and to volitional control. Often it is supposed that it is synonymous with self-education and self-realization. Strictly regarded, self-activity can have meaning only when one introduces the determinant factor of the self. This adjective immediately classifies, by implication, activities into two groups; those which refer to the self, and those which contain no reference to the self. The usual sense of the term is to imply that the relation of the self, which is involved in the activity, is that of origination. Thus, educationally, it is implied that a great deal may be done *for* the pupil in a mechanical way, and a great deal may be done *by* the pupil in a mechanical way. These actions are to be violently contrasted with those particular actions of the pupil whose origin is to be found within himself. This limitative conception also implies, in a descriptive way, that the child or the pupil is possessed of the means for performing an indefinite variety of actions which do not belong to this specific kind.

Whatever may be the testimony of psychology to the dependence of conscious activity upon the physical movements of the individual, it must be maintained that the real meaning of self-activity must be found to consist in direct reference to the fundamental characteristics of the changes which take place in the ideas and the connections of ideas in the mind of the pupil. In other words, it relates to the whole question of the development of the higher mental processes, and the equipment thereof with an acceptable content. (As may be noted a little later, this content is provided for in the detailed objects of the course of study). Thus we are immediately led to see that self-activity is a kind of experience which is essentially separable from the mechanical and the habitual. As a principle of teaching, it is merely an abstract way of saying something to the effect that the real work of being educated cannot be entered upon by the child until his growth has enabled him to acquire a definite amount of voluntary control over his bodily movements and some of his mental processes. Indeed, self-activity is most often used in such a way as to suggest its immediate relation to will, or willing, as that which explains the principle. Will, however, is a term which carries one immediately to a thought of discipline, government, restraint, offense, and punishment. Class instruction, however, while intimately connected with class government, is not to be identified with the same, and the attitudes of mind involved in both are radically different.

Approaching the central theme of this *Monograph* more closely, and returning to the suggestion opening this discussion, we are led to think of the multiplicity of "objects" and the many subjects introduced into the course of study filling a pamphlet of forty-seven octavo pages. In spite of the possibility of many correlations and interrelations in the work of the seven years, these "objects" and branches of knowledge do not represent identities nor correspondences. The self-activity involved in one grade is not comparable with the self-activity involved in a later grade. When one inquires: How are the teacher and the pupil to master these multiplicities for educational ends? How can all these different things be submitted to the *one* process of self-activity? Then it appears that objective relations must not be emphasized at the expense of acquisitive and expressive processes. It also appears that self-activity has inherent limitations as a guide to instruction, so long as the teacher forces himself to accept the restricted meaning of that term as fixed by the psychologist. Perhaps, too, such inquiries make clearer the truth that self-activity is not a special content or object that can be handled, but that it is essentially a process, a relation, an attitude.

It is necessary that we understand aright that the teacher *per se* has intellectual obligations to the *class* in our modern school-room, rather than to the individual child, which tend to reveal a quasi-ethical aspect as the pedagogical development continues. With our accentuated psychological interests, which emphasize the individual, and with our methods based on that sort of a psychology, we are forced by every consideration, almost, to regard the one child as the unit and point of departure. In educational theory we may, perchance, remain homocentric in our elaborations. But, in consequence thereof, the "practical" teacher finds these theories abstract, or inadequate, or foreign to the presentations which the school as such offers. In other words, the teacher is pedagogically related to the class, and not to the individual members thereof. This is emphasized in such practical suggestions as these: Information should not be given to one pupil, but to the class; the teacher's energies are dissipated in allowing the pupils to have individual claims upon him for explanations of difficult words, problems, constructions, etc. The error of regarding the individual as the unit cannot be replaced by the fallacy, so current, of applying the conception of an organism to either the school or the class.

This fallacy is brought to light through reference to the possibility of relieving the individual, under such a conception, of even "organic" responsibilty for the work of the class. The evils of inattention, listlessness, etc., are pedagogical features which are fostered in a *regime* so conceived. The class is a temporary aggregate of individuals, and not an organic unit.

By class instruction, we must mean the attempt to get a number of pupils to receive ideas in a common way. Without designing to minimize the aim of all instruction, or to give undue emphasis to one aspect of school work at the expense of all others, it may be set down once for all that *class activity* and *class relationship* comprise the central facts in the organized school. Evidences for this view abound on every hand. Indeed, the school would seem to exist solely as the particular means of bringing teacher, objects and pupils together for the sake of ideas in the latter. These central facts are apparent in the device known as the "recitation." The pupil is measured by his share in the results of instruction there given, and the teacher is judged on the basis of his behavior to the class.

Perhaps a few additional reflections may summarize the foregoing discussion, and suggest some "applications." Letting children have their own way is not identical with employing their "self-activity." Guidance in class-instruction means directing the child's efforts in its own behalf into the proper channels. Mere voluntary control does not determine the type of material which shall be made an object of instruction. To be self-active means that each member of a class shall possess duties and be attending to them. The permanent results in knowledge and adaptation do not accrue to the class whose teacher refuses to repeat and to review. Repression of spontaneity often comes from that treatment of pupils which postulates that they are eager to violate the regulations of the school community. The recognition of self-activity as a principle of teaching is not inconsistent with an admission that many, if not most performances accomplished in school life do not follow from origination within the self.

The Basis Of Arrangement Of Class Instruction.

By CHAS. H. JUDD, Professor of Psychology, New York University.

THE demand is very frequently heard that daily class instruction shall have some kind of internal unity, that its parts shall be interrelated or correlated. It is pointed out in defense of this demand that all memory, and indeed all knowledge, can be very properly defined as a system of interrelated ideas. It is held to follow from this general principle that the acquirement of ideas will be facilitated by the presentation of them in groups. And so it has been recommended to teachers that the instruction of a given day or week be planned so as to center about a single subject or about a group of closely interdependent subjects.

However well this may work out in theory, the fact remains that no practical scheme of correlation on this basis has yet been developed. Teachers feel instinctively, even where they can not see clearly, that the unity resulting from such a system of correlation or concentration is artificial and is secured at the cost of thorough, systematic drill. They recognize the fact that after the child has heard and enjoyed the story of Red Riding Hood, it is absolutely impossible to carry the same kind of interest and enjoyment over into an arithmetic lesson by asking the exceedingly unromantic question suggested in one of the elaborate schemes of concentration, "How many things did Red Riding Hood take to her grandmother?" Or this other question, "Show as many fingers as there were trees around the grandmother's house?"

The trouble with the schemes suggested for the correlation of class work is that they fail to recognize a very fundamental fact of human nature. This fact is that the kind of interest one has in counting, or in studying the habits or anatomy of an animal, or in looking critically at forms of objects, is not the same as the kind of interest which one has in the free exercise of imagination. To bring Red Riding Hood down to the level of careful numerical explanation, or critical consistency, is foreign to the whole genius of story telling. It is a veritable harnessing of Pegasus, and is followed by the usual results—he will neither work nor fly.

This modern pedantry which bids us drag romance down from its true place and try to make it the foundation of science; or which advises us to bring in science quietly and without announcement in the hope that science may thus pass for romance—this false doctrine may find some support in the purely external fact that the same object may be looked at from many points of view, but it utterly ignores the more important fact that human beings are so limited in mental possibilities that they can see clearly only when they concentrate attention on a single aspect of the object. Nor is it enough to offer the defense that the child is, under any proper scheme of correlation or concentration to look successively upon these different aspects, seeing each one clearly in proper sequence. The fact is that certain things were never intended to be looked at from more than one side. Red Riding Hood for example, is such a one sided view of animal life. The real wolf never talks, never could deceive a real child into mistaking it for a person. Red Riding Hood contains some very false teaching if it is to be treated as science. Bring it in as science and it loses its own peculiar interest and misleads the pupil in regard to the facts of nature.

Negative criticisms of what we may call external correlations could be presented in indefinite numbers. Such negative criticisms are not productive, however, of real advance in teaching and we must leave the suggested criticisms and turn to positive, constructive treatment of the subject in hand.

Positive treatment is much aided by a discovery that teachers have made in their practical experience. Teachers have discovered the necessity of drill. What does drill mean in its best sense? It means that the child who has begun to learn a certain way of performing a certain operation, shall be called upon to repeat this operation in a great variety of conditions, so that he shall see the way in which this one activity can be applied to a great variety of objects. The unity here is not in the objects dealt with, but in the way of dealing with them. This is but another way of pleading for the teaching of principles rather than of single objects. If one definition can be given to fifty objects, that is, if all these objects can be viewed from one point of view and can be treated as alike in one aspect at least, then these objects have been formed into a unity of a very important and useful type. This unity is not the unity of a single object, but it is the unity of a single mental attitude. In developing by drill such a unity, a definite mental attitude will be strengthened and fixed. The child can learn to respond vigorously and accurately in one way at least, to the group of objects included in this class.

This is the method of practical life. We do not wait to analyze and comprehend in all its possible aspects a practical situation. We say that for the chief purpose in hand at this moment this situation has such and such important characteristics. And we act on a limited, but quite adequate view of the conditions. Why should the children in the schools be taught in spite of this lesson from practical life to take a given subject and turn it over and over and over? They do not enjoy this kind of exhaustive treatment. What children do enjoy is to use a new found power of action in as many different conditions as possible. Thus, teach a boy to count and he will count everything. He does this not for the sake of the things he counts but for the purpose of exercising his own power. Teach children to measure and they want to measure everything.

There is a joy in that particular act. It is absolutely contrary to human nature to turn the matter about and try to exhaust a subject in all of its aspects. What we should try to do in the schools is to cultivate well and fully the ability to look at objects and conditions correctly from certain points of view, and then leave it very largely for the individual to discover that a given object in its entirety is capable of more than one mode of treatment.

Thus, literature has its own peculiar mental attitudes. It is informational in some cases, in others it is inspiring. Sometimes its chief interest rests in natural objects, sometimes that interest is in human thoughts and human conduct. If these different attitudes are lost sight of, we may see the inspiring form turned into a grammatical grind; we may see the story of human bravery or human sorrow turned into a lesson on commerce or zoology. Such things as these are the results of a too great and too blind devotion to external relations. The devotion should be rather to the full establishment and illustration of one attitude at a time.

In doing this there will be no disadvantage; on the contrary, there may be a very decided advantage, in drawing sharp distinctions between the successive lessons of the day. It is a well known principle that change often rests one. If the child can stop at the end of one lesson and feel that he has come to a new line of thought and effort—one dealing with new subjects and new material for treatment, the relief from change will come. If, on the other hand, the child sees the same subject before his weary thoughts hour after hour, he will rebel just as adults would under like conditions.

I dare say that some reader has been saying all along through this discussion, "What! will you destroy the unity of our course of study entirely?" Not at all. There is a definite form of unity that may appear and does now appear in our practical courses of study. It is what we may call sequential unity. All the work which deals with a certain group of related mental attitudes may be brought together and taught in proper sequence. Thus, for example, counting and adding, and subtracting, etc., may be taught as a systematic group of interrelated activities. The subject of arithmetic is thus recognized as having a character and progress of its own quite independent of what goes on in the study of literature or of geography. This is the form of unity to be emphasized. And each point in such a system has unity. The unity of each point is to be found in the fact that at that point all the illustrations contribute to the establishment of a single principle.

I believe that one of the greatest needs of our education to-day is that it come back to principles. A series of associations running out from an object to its environment in this direction or in that, is a string of beads rather than a unity. Teachers need to acquire the high ability of selecting one important principle for each lesson and r each series and then they need to understand how to draw out ppropriate illustrations for these principles from every department of the child's experience. But in doing this it should be the lustrations that are incidental, not the principles. It should be e illustrations that are brought in when they fit the principles, t the principles that must wait for some fortunate moment when ey may come in with an opportune illustration. This turning of ithmetic out of our schools to make place for history and fables, to make place for store-keeping and cooking lessons, will come no good end, for those who advocate these things have forgotten e true saying that there is no royal road to the discovery and tablishment of the principles of wise action and judicious thinking.

The plea must be made for an arrangement of class work on the inciples proper to certain lines of thought and action. The most ementary lines of thought and action differ from each other. Therere we may very properly teach writing and reading and arithmetic d geography as individual unitary subjects, each for itself. Each sson should have its own basal principle to be established in the aching; and the teacher should have that principle clearly in ind. Each subject should have a sequence of principles; and the acher should understand that sequence. Then the cross references ill take care of themselves. They will be incidental to the stematic course of instruction, not prominent in the determinaon of the order of the course.

Pedagogical theory should devote itself to the discovery of the ndamental principles underlying each of the subjects of instrucon and to the modes of systematic development within these bjects. Thus, writing should be treated as a mode of hand and m movement and the principles of coordination on which it pends should be understood and consistently established in their actical order. Arithmetic should be resolved into a fundamental rm of operation or group of operations as attempted in Dewey d McLillan's "Psychology of Number," or as attempted by . Shersky in the article published in the Journal of Pedagogy last ear on "Mathematics as a Science and its School Substitute."

The practical teacher may devote herself to less ambitious ans perhaps, but her plans should be of the same type. What e the fundamental thoughts to be established in the various ssons of to-day? How does each thought relate itself to the ndamental principle in yesterday's lesson on this same subject? hese are the questions that should be uppermost in determining e plans of class instruction. The illustrations should then be rawn as simply and directly as possible, from the child's experience a general and unrestricted way. These illustrations should not taken up with any view to exhausting all the possible suggeson that they contain. They should be used only so long as they lustrate, not when they begin to eclipse the underlying truth.

The Formal Steps Of Instruction.

By Walter L. Hervey, Board of Examiners, New York City.

MY aim in this article is to set forth what I believe to be of permanent and essential value in the doctrine that there are "formal steps" in instruction, understanding by "formal steps," those processes which must be accomplished by every teacher, whatever the subject or topic he teaches, before he can truly say, "In this topic I have completed the act of instruction." And because I have long felt that this doctrine, as sometimes interpreted and applied, emphasizes overmuch uniformity and mechanism, the drawing of hard and fast lines, and the adhering to a scheduled order, and that it emphasizes too little certain matters that are of vital importance, I shall venture to point out incidentally some dangers and limitations of the current view.

We shall all agree, I suppose, that the formal aim of all instruction is to make that which is taught the pupil—the view of the world which is the content of instruction—a vital element in his mind and his very own.

The knowledge presented must live, that is, it must be not dead weight, but vital with potency for conduct. And the knowledge presented must become the pupils very own. No knowledge is truly our own unless it be ours not merely for keeps, and ours for practical use, but ours so fully and absolutely that when we need it we can call it and it will come to us, or will come without being called, just as our right hand anticipates our conscious need.

The engineer who knew that "heat expands iron" but who built a bridge without allowing for expansion, had knowledge, I suppose, after a fashion, but his knowledge was neither fully alive nor fully his own. If it had been either, "heat expands" would have rudely jostled "snug joints"; images of "summer expansion" would have bumped against images of "winter contraction"; and something more practical than a buckling bridge would have emerged from the conflict.

The central problem of instruction considered as a formal process, i. e., considered apart from the choice of subject matter, is, then, the problem of making knowledge very much alive, and very much our own; the key to the solution is evidently to be sought in the nature of the mind itself; and that view of the mind which we shall find most helpful and suggestive is that which regards the mind as an arrangement for converting stimuli into reactions, for transmuting experience into knowledge and knowledge into life. Taking this view, we are able, from out the bewildering mass of facts and laws of mental activity, to seize upon three basic and guiding principles.

I. From first to last our thinking and learning is practical. As we think we are learning to act. As we act we are learning to think.

Our minds are given to us, as far as we can make out, in order that our behavior may be better, more efficient, more productive of happiness to ourselves and others. Thoughts and deeds are, then, but two sides or aspects of the same thing. A thought without a deed is not even a complete thought. For, on the one hand, no thought is clinched, rounded, full-orbed, until it has been acted on. A thought not linked in some way with action is gibbous, slim, shriveled, moribund. And, on the other hand, a thought which does not spring out of a deed is comparatively pale and sapless, for it has no depth of earth.

From this principle it follows that we learn by doing, we learn while doing, we learn through doing; and without doing we can not learn vividly, permanently, practically.

It further follows that we should teach nothing that is not of use, and that while we recognize that we indeed *can* teach nothing that is not of *some* use, we should also be alive to the truth that we may by our method of teaching, make the highly useful comparatively useless, and the comparatively useless moderately useful.

Finally, from this same principle it follows that at no stage of instruction can the idea of use or of application be safely absent. Preparation is often most surely and expeditiously accomplished, not by bringing up old knowledge as a reception committee, but by springing a practical problem, by flushing before the young huntsmen of the class, a covey of game birds to be bagged, by showing the use of that which it is proposed to present, either in its bearing on other knowledge or in its application to the problems of life.

It should be noted here that the maxims, "Turn to use," "Learn through doing," are akin to the maxims, "Present to sense," "Present a good model," "Teach objectively," "Evoke the will." For when we act and when we turn to use we are willing and we are dealing with matters at first hand; we are getting *sensations* of acting, which sensations are the basal elements in our education.

II. A second psychological principle bearing on instruction is this: No knowledge can lead to action and bear on life unless it appeal to the imagination. It is not possible that the abstract as such should by itself influence life. The only road to the will is through the concrete, (i. e., through presentations and representations), or through the abstract supported by the concrete.

These representations or pictures may be of oneself or of others in various situations, the tendency being for each observer to project himself into any situation, witnessed or imagined, so that he not only sees it as from the outside but feels it from the inside. I once heard a little four year old, watching the game of nine-pins in the play of Rip Van Winkle, ask his mother, "What would they do with little boys like me up there?" He was not a mere observer, he was "up there" in imagination, both acting and being acted upon. His imagery was near neighbor to his springs of action. So should all imagery be at some time thus personal, practical. The more it is so, the more vital, permanent and personal will be the knowledge it bodies forth.

King Henry V. understood, or at least acted on this law. Read again his appeal to the commander of the French at the siege of Harfleur to surrender at once in order to avoid the horrors of a sack. The masterly way in which he fills the minds of his auditors with concrete and personal pictures of rapine is a great illustration of the power of imagery. So also is the King's magnificent speech to his despondent soldiery on the eve of the battle of Agincourt. After the lapse of six hundred years those pictures he drew are so fresh and vivid, that we, reading the words that call them up, find ourselves envying the happy survivors of that fight, and wishing it were ours to win glory like to theirs.

If then you wish to give instruction that shall live in the mind and bear fruit in life, there is but one way aside from action itself in which to do it: Be concrete or use words that the pupil can make concrete. Lead the pupil to picture himself in the situations described, or (in view of his natural tendency to do this) do not interfere with his natural bent towards putting himself in the place of those who may be presented to him.

The maxim here applicable is "Teach representations as representations," or, more simply, "When teaching that which involves calling up mental imagery, see that mental imagery is called up in the minds of those taught."

III. But an act of instruction in any topic or lesson which stops short at sense and imagination is a torso. The great image which is the product of instruction must not only have feet of clay and iron and trunk of brass and silver but it must have head of gold. "Instruction must complete itself in the study of causes." "The end of instruction is the formation of general ideas," just as "the end of education is the formation of general habits of response to environment." The reason for these maxims will I hope be made clear in what follows.

Instruction as we have seen, has to do ultimately with behavior. The "circle of thought" of the Herbartians answers to the "complete living" of Herbert Spencer. These two, thought and life, are but the sides of the same shield. But sense and imagination alone are inadequate to form a circle of thought. Mere imagination leads him who is the slave of it to follow now this, now that model, without adaptation and without choice. Mere imagination deals with cases as individuals, not as members of classes, and so misses the economy that comes from applying the same solution to all cases of like kind. He who is under the sway of sense or of imagination lives in a world of single acts, each springing from its own idea and at war with every other. But instruction aims not at producing a series of discrete acts but at producing trains of acts springing from organized groups of ideas. Organization of the mental forces requires that single images be broken up, regrouped like with like, condensed, labeled, and wrought into systems of thought, corresponding to systems of action or conduct.

All this is only another way of saying that we cap the climax of instruction by leading our pupils to think. That is, we must lead them to break up (analyze), compare, select the essential point, and express it in language, in the form of a law, a maxim, or other general statement. The acme of practicality and life in instruction is reached when its result is embodied in a general concept (or general statement expressing a general concept), which concept is enriched and filled with a host of meanings or pictures of particular deeds ready to come at call. The particular notions stand for individual acts. The general concept holding together many particulars answers to a consistent and well ordered course of action, in which means are adjusted to ends, and other means are in reserve to meet emergencies. Unless individual notions be so organized, subordinated, concatenated, the action resulting will be scrappy, spasmodic, inappropriate, inconsistent, ineffectual, and self-destructive, the individual pictures of action interfering with one another, or breaking loose and "going off" without judgment, without moderation, and without result of value.

These three laws suggest, to my mind, what must be the essential elements in every act of instruction, whatever the subject matter and whatever the age or condition of the pupils. Omit any of these and instruction halts. Satisfy all these conditions, and instruction goes happily to its goal.

It has been held that there is a further question of paramount importance in the psychology of instruction, viz: On what conditions may knowledge be admitted into the mind, and as it were, feel at home there? I have said nothing about this for the reason that if you satisfy the three conditions I have named, apperception will take care of itself.

Turning now to the doctrine of the formal steps as summed up by McMurry in "The Method of the Recitation," (p. 214), let us examine it briefly in the light of the principles just laid down.

"If the leading thoughts thus far presented are true there are certain *steps* in instruction that are universal. No matter what the study be, whether Latin, Mathematics, Science, or some other, there is a certain order that the mind must follow in acquiring knowledge. Through the old related experiences (first step, preparation) new individual notions are reached (second step, presentation); these are compared and their essential characteristics abstracted (third step, comparison), and the resulting general truth is worded (fourth step, generalization); this generalization finally receives application; (fifth step, application). Since these steps are passed through in this invariable order without reference to the nature of the subject matter presented, they are rightly called the Formal Steps of Instruction. They indicate the order of the movements of the mind, or of the forms through which thought must pass in reaching full maturity."

These steps, it is elsewhere explained in this book, are to be kept separate, no new matter, for example, being allowable in the step of preparation, (though I have reason to believe that one at least of the authors of the book—the one best known here—is not an advocate of any such strict construction of the law.)

It will be seen at once that the formal steps are in close agreement with our phychological analysis. Preparation, as we shall show, embodies all three of the principles, presentation answers to the first and the second, comparison and generalization to the third, and application to the first.

What I wish to consider in the doctrine, is, then, not the choice of the steps, but their relation and their use, asking these questions: In what sense, if in any sense, are these processes to be regarded as "steps" sequent in time and distinct from one another? What is the wisest use to make of this doctrine?

In the first place, then, in what sense are we to think of preparation as a "step," distinct from the rest, and uniformly consisting of the bringing up of "old experiences?"

The need of preparing the mind for what it is to receive, appeals at once to common sense. It is recognized and has always been recognized by all men of every age and of every calling who have known how to break bad news, or to make their thoughs weigh with others, or tactfully to approach and "touch" their fellow men.

But there are many ways of preparation. Sometimes it is best to begin with action, reserving explanations and postponing prefaces. I know an admirable English grammar that begins, not by asking the children to understand something, but by giving them something to do. Sometimes we can best prepare by appealing to the imagination, or to the curiosity; and sometimes by appealing to thought—stating an aim, propounding a problem, even formulating a bare outline. But the essential thing is that the mind be aroused, that it be warmed, that it be, as we say, interested or in a state of desire for that which is to follow. To this end it may suffice to make statements of fact, or to call up as many related ideas as possible that these may serve as an "apperception mass." But sometimes the best way to begin is bluntly to begin, shocking the mind into activity by the plunge.

Compare the introductions of Sir Walter Scott with the swift *in medias res* of Browning; compare the tactful solicitude of Ahimaaz, on of Zadok, who outran Cushai, that tidings of victory might precede by a little space the news of Absalom's death; with the bluntness of Peter to Sapphira. Browning and Peter may not be good models to teachers in respect to preparation, yet I have observed that minds have wonderful powers of adjustment to a straightforward and even blunt approach.

To sum up: Statements of facts are often not so effective as statements of questions or problems; words not so effective as deeds; to call up as many related ideas as possible not so effective as to call up as few related ideas as will serve the purpose. And in general the best way to arouse a demand for that which is to be presented, wrought out or experienced, is not by a "statement of aim," (which is sometimes very cold and perfunctory) and not merely by calling freshly to mind what the children already know about the subject in hand, but by bringing home to the children, preferably by engaging them in some form of activity in which they can not go a step farther without the new light, a sense of their ignorance, and so making them hot for release for their bondage to it.

Again, "preparation" is not an act to be performed at the beginning of a topic or a recitation and then to lapse into desuetude until another lesson or topic is taken up. Preparation occurs at each step in teaching; each step should prepare for the next. Good teaching from start to finish is steeped in preparation. Preparation is no more an antecedent of the first step than it is of the third. Setting apart one time for preparation seems to me a little like saying prayers enough on Sunday to last for a week.

From this view of preparation two things seem clear: First, that preparation may involve presentation, thought or application, or all of them; and second, that each of these involves preparation. There are an infinite number of preparations within each method-whole, and there should be infinite variety in the method of handling them. Hence it seems safe to say that preparation is not so much a step, coordinate with the rest named, and preceding them all, as it is an attitude of mind to be continually preserved at each stage of the teaching process.

And as for the steps of presentation, comparison and generalization, while it is clear enough that imagination must usually precede thought, since thought is merely the marshalling of images for action, it is equally clear that in many acts of instruction we first ask the children to think and afterwards to imagine. We sometimes first get our stuff and then measure it, but we sometimes do our measuring—classifying, preparing of pigeonholes and categories—before we get our stuff. When for example, I wrote awhile ago, "We are able to seize upon three basic and guiding principles," I did not first give the principles and then point out that there were three of them, and that there were principles; I told the number first, thinking to help any one who might read my words to make ready his mind for what was coming, much as a farmer makes ready his bins to receive a crop of wheat estimated to require so much space. We regularly do this sort of thing in the teaching of grammar as such (*i. e.* if we teach it properly), and in the teaching of physics and of geometry; we do it at one time or another in the teaching of all subjects.

As for the step of application, it has already been made sufficiently clear that as a thought is only an act in the making, and that a life is made up not so much of thoughts and of actions as of thought-acts, instruction should at no stage get far away from action and use, being always headed in the direction of these, even though they must and should be often, for the time being, out of sight and out of mind.

In fact one of the commonplaces of psychology is that precisely the last thing we get in our learning is the knowledge of the individual thing, and that the first knowledge we have or can have about anything is cursory, vague, and, in a way general. The child who is not trained to think sometimes apart from definite imagery is not trained for life. Some concrete imagery must, of course, have preceded every act of thought; but such experience is often remote from a given act of instruction, and what we are here considering is not the order in which experiences come to us or are appropriated by us in life, but the supposed order in which, in a definite act of instruction, the mental processes should be called in play.

This question as to the precedence of steps is like the question, "Which should come first, an appeal to the Intellect, to the Emotions, or to the Will? Why, it depends on circumstances that differ with each case, each class, each teacher. Sometimes we go forward into a subject, first facts and their organization, then feelings and desires aroused by these facts, then action flowing from these. But sometimes we *back* into a subject, and start with vague longings and gropings and then light on our facts, or start with deeds done in ignorance and blindness and reach our insights, as it were, by the back door. I had almost said the latter is the more frequent and the more natural way of the two.

All these considerations point towards the same conclusion: These are steps or stages in instruction, and order must be observed in following them. But it does not appear that in every complete act of instruction these steps must follow in the same order, or that such steps are rigidly exclusive of one another.

The human mind (generally speaking) is not a blunderbuss. Yet from the directions for making lesson-plans which I have known to be given to advanced classes by teachers of the formalist type, it would appear that teaching the mind is precisely analagous to loading a brass cannon. Swabbing, taking aim, loading with powder and shot, ramming home, setting off the fuse, all must come in a certain order not be deviated from. Such a figure limps on both feet. In more senses than one it smacks of militarism. One who is appealed to by it belongs in a factory where things are made, or on the firing-line where people are shot at, not in a school where minds grow and are fed.

To my mind the deepest value of this doctrine of the "formal steps" lies in the notion it conveys of what constitutes a complete and ideal act of instruction. This is the law and it is absolutely general: No teacher in any subject or topic has fully accomplished an act of instruction (1) until he has made what he would teach live in the imagination of his pupils; (2) until he has led them to think about it and others of like kind, grouping like with like, neglecting non-essentials, searching for cause, and finding or framing some general expression—whether it be word, statement, maxim, law—that will serve as a remembrancer, a rallying point, or a symbol; and (3) until he has linked the knowledge in question to practical life, either at the beginning or at the end or at both beginning and end, and in the middle, of the teaching exercise.

I have often been struck with the futility of attempts to follow the formal steps *as steps*. Where, for example, preparation has been made a distinct step I have often observed the work to be too formidable, as if the machinery were burdensome; perfunctory, as if the aim in view were the accomplishment of a step, and pitifully ineffective. And it has at such times seemed to me that if the teacher, on the eve of presenting a new topic, had had uppermost in mind the ideal of making that subject live in the imagination and bear fruit in the life of his pupils, he would have been more likely to prepare their minds artistically, economically, and effectively than if his mind had been set on accomplishing the step of "preparation."

Therefore, the best way, in my judgment, to profit by the doctrine is not to think chiefly of steps, or of sequence, or of separateness, or of junctions at which one must change cars for the next step—the best teachers when at their best are, I trow, not thinking about the formal steps—but to think chiefly of the ideal end of instruction, as being that happy state of pupils' minds in which, for warmth and resource, there are abundant stores of concrete imagery, and, for economy and serviceableness, there is organization—pigeon-holes and tags, card catalogues and indexes, or if you will, generals, lieutenants, and privates, each knowing his duty and each on the qui vive to do it. The formal steps are, then, so many ideals which the teacher must attain before his work is done. They are, as McMurry has truly said in the passage above quoted, "the forms through which thought must pass in reaching full maturity." The teacher whose mind is filled with this fructifying conception will find himself learning how to prepare the soil for the seed, how to put things "right end to," how to ask questions, how to suggest applications, and how happily to vary his procedure under varying conditions, in the interest of freshness and vividness of impression, keenness of interest, and abidingness of result.

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making haste. She talks and talks, teaches and teaches, and the pupil scribbles and scribbles. The teacher is so busy teaching that she does not stop to think; the pupil is so busy working that *he* does not stop to think. If the teacher stops talking she does not stop teaching, for she gives her pupils some specific task to perform, and then hustles about to see that they do it quickly and in the prescribed way. Finally, both leave school so loaded down with "home work" that neither has time to think when out of school. The process of intellectual digestion is impaired by continual stuffing. Imagine the condition of a digestive apparatus, the owner of which is so busy swallowing that he has no time to chew.

What shall we do? Relieve the everlasting "double quick" by a "parade rest" occasionally. Stop and think, both teacher and pupil. Let us remember that rapid progress is not possible except when we are following a plan carefully thought out, and the pupil must do the thinking as well as the teacher. When questions are asked an answer must not be expected too quickly. If the question can be answered quickly it is usually, indeed almost always, not worth the asking. The most serious criticism that can be made upon the work of the greater number of our teachers is that they do not give either themselves or their pupils time to think; and the most serious criticism that can be made on the preparation of our high school pupils is that they have not been taught to study and to reflect.

In the history lesson we consider the remote as well as the immediate causes of the civil war. In like manner it may be well to discuss the remote as well as the immediate preparation of the student for the lesson. From the very beginning much time should be given to teaching the pupil how to study. By that is not meant the formal way in which he ought to prepare his written work, but the way he ought to attack his task; to crack the nut and seek the kernel from the start. Of course, very little can be done in the lowest few grades, and indeed probably most of the experienced teachers in those grades do what can be done fairly well. It is not there that the leakage is. It is not there that most of the training in this direction is to be done. It is rather only to be begun there, and then carried on in a constantly increasing degree as we approach the higher grammar grades, until, when about twelve or fourteen years old, the pupil has acquired proper habits of study. From that time on less and less attention in this direction ought to be necessary. The early lessons devoted to each new subject, even throughout the entire high school course, are most profitably given to teaching the method of attack and the apperception of the matter under consideration—the articulation of it with that which has preceded it. The writer often tells his associates in the high school that in beginning a new subject—as for example, algebra—the first six weeks are well spent if the attention

Preparing The Student For The Lesson.

By Charles D. Larkins, Manual Training High School, Brooklyn, N. Y.

TO prepare the student for the lesson is, first of all, to teach him how to study. Studying is an art, an art easily acquired by some, difficult for others, and seemingly unattainable by many. Like other arts, it is to be learned only by practice; and, as in other arts, it is necessary to direct the efforts of the learner to secure rapid progress. The most skillful teacher is he who can best teach his pupil how to study.

Out of an experience of twenty-four years, the writer has given twenty years to teaching in, or directing the work of others teaching in high school grades. The opinions here expressed are, therefore, valuable only as enforced by such experience.

Pupils coming to the high school are usually in most respects well prepared. They have been taught a sufficient number of facts, and, in the main, those facts have been well enough selected and well taught. They have been taught also to pore over their tasks, to dig and grind, and that without stint of time. They have been taught just how to do certain things, and many of them. But the high school teacher finds that many of the pupils do not know how to study, and he feels that a systematic effort has not been made to teach them how.

The above statement carries with it the obligation to explain what is meant by studying. Study has been defined as *the close application of the mind to any subject.* That is a part, but not the whole of the process. Our pupils can do that. They can do it intensely. They ought to be taught not only to apply the mind closely, but also how and when to stop; to sit back in the chair and reflect, ruminate,—mentally chew the cud—and also how to pick, sort out, cull and rearrange; how to see the relations of the facts under consideration with each other and with those that have gone before. They ought to be taught to *think the thing over* when their eyes are not on the book.

The inability or the unreadiness to study does not seem to come about because of poor teachers, too many subjects, or the effort to cover too much ground in those subjects. It is rather the result of irrational methods of procedure, and chiefly of continual hurry and a consciousness of pressure from above on the part of both teacher and pupil. The teacher feels that she must hurry, hurry, hurry. That is the trouble. It is hurrying instead of should be given to a brief review of the preceding work, the purpose being to pick up such parts as have a direct bearing on the lesson of the day, so that the day's work may be welded, so to speak, to what has gone before. This part of the recitation may well take the form of a quiz.

The second should be given to the lesson for the day. The burden of talk should be on the pupil. The class should be held closely to the work in hand, but the nearer the class comes to a general discussion of the topic the more successful is the recitation. A hit or miss, go-as-you-please confab is not meant, but an orderly discussion of the subject under the careful direction of the teacher, in which each student takes part as the teacher may direct. Questions should be few and general in form. The student should feel that, instead of being pumped for facts, he is to be held accountable for a clear and well-digested knowledge of the topic, so formulated in his mind that he can present it clearly and forcibly. Opportunity to show power as a teacher is greater here than at any other point. I wish that every reader of this article could have heard a seventh-year class recitation in American history that I chanced upon in a Medford, Mass., grammar school last year. The teacher said very little, the pupils a great deal. The teacher was an artist.

The third part of the period, probably a quarter or less of the time, should be given to a careful outline and study-plan of the lesson to be assigned. This part of the work should always be introduced by a clear statement from the teacher of what the new lesson is to cover and its relation to that previously under discussion. The lesson assigned should embrace a complete topic or subtopic, and should carefully observe what Dr. DeGarmo calls the method whole. While the teacher should know in advance exactly what the study-plan will be, the class should take an active part in its preparation. Usually very few if any examples or problems should be assigned with the advance work. They should rather be assigned after the topic which they illustrate has been discussed by the class. It will readily be seen that the student has daily two things to do: First, to dispose of problems, examples, exercises, and so on, to illustrate that part of the work last under discussion; and, second, to prepare his lesson in accordance with the study-plan that has been given him in class. When he has been taught to do these things well, and to think the matter over by himself in his own way, he has only to learn to lay out a study-plan for himself, and he has acquired the most valuable part of the training incident to school work.

of both teacher and pupils is given chiefly to the mastery of the art of studying the subject. While teaching geometry for years, he was well satisfied if he covered one-sixth of the work laid down for the term during the first third of the term. The real effectiveness of the pupil's work is directly proportionate to his ability to study correctly.

Let me illustrate by a case in hand. Not long ago a girl came into the office with a note from her father asking that she be allowed to drop general history, and adding that it was impossible for her to do the history work. He further said that she had no hope of promotion unless she could be excused from studying history, and that she was so discouraged that he should take her out of school if his request were not granted. The young woman herself told me that she often spent as much as four hours on her history lesson, and that she had spent more than two hours on the lesson for the day. A little questioning showed that she did not know how to get her lesson, so I spent half an hour with her showing her how and what to study, what to try to remember, and what not to try to remember. She went to class after a request to report her success with the day's lesson. She reported it to be the first good history recitation she had ever made, and consented to try it a little while longer before giving up. She never entered another complaint, and long after told me that she had no more trouble with the subject.

Closely associated with study is expression. Few of our pupils have the ability to talk well. It will be said immediately that few grown people have that ability. Granted, but it does not follow that most people would not have the power if systematically and carefully trained to talk. Most teachers talk too much, and practically none require their pupils to talk enough. Of the twenty-five teachers working on the academic side in the school with which the writer is associated, there is only one who does not talk too much; and there is not one who requires his pupils to talk enough. The principal has during the past year made this criticism on the work of the school oftener than any other. Pupils should be trained from the lowest primary grade to talk; to talk in connected and properly arranged sentences; to stand and tell a story logically. The pupil who has learned to express himself freely will formulate what he has to say as he studies. Thought is so closely associated with expression, that it is questionable whether anyone can really think well who cannot express himself readily and well. There are those who do think well and do not talk well; but the fault in talking lies probably in want of confidence rather than in want of ability.

The immediate preparation of the student for the lesson depends upon the manner of conducting the daily recitation. The recitation period ought to be divided into three distinct parts, not three equal parts, but parts so distinct that both pupil and teacher will be conscious of the divisions. The first to find the answers to the questions by re-reading Act II., and then to write out the answers. The children responded with alacrity, and next day they showed good home-work.

Thirdly, the kind of work appropriate for home assignment must be such as permits of being readily tested. Children will not long continue to prepare their lessons properly if they find that the teacher fails to call for the results of that preparation. They crave the recognition of duty done, and they deserve it, too.

For these reasons, written home-work is especially suitable. The material that has been developed in the recitation period needs to be fixed in a permanent form, and this is definite work that can best be done when there is no one at hand to depend upon. It gives an added purpose to the recitation if the pupils have to look forward to writing out, in the exact form that written work always requires, the substance of the daily lesson. This makes possible in the recitation the use of the developing method, in place of the recitation form of the text-book. The preparation of lessons from the text-book at home is, however, also in place ; provided that the points that should be developed have been attended to in a previous recitation. If such work as is here proposed is assigned for writing out at home, the proper preparation of it will depend largely upon the use of tables of topics. If such a table of topics has been prepared during the recitation that developed the subject, then the pupil will have the needed help for an orderly reproduction of it, arranged in sections, paragraphs, and sentences corresponding to the topics.

Secondly, the committing to memory of gems of literature, songs, etc., is appropriate for home-work. These are definite, and in the process of learning them by heart the pupil needs no help, after the thought has been developed in the recitation period at school.

Thirdly, topics may be assigned to pupils in the higher classes to study in encyclopedias, in the book-shelves of the library, or in other books at home. This is necessary if the school is going to teach the pupil to use books, to study topics rather than pages, and to weigh facts and statements before forming an independent opinion. Direct observation of objects and even experiments may be assigned for home-work, if the children are given a chance to know exactly what is expected of them.

Our children are not troubled with overpressure in school as much as are the pupils of the secondary schools in Germany. Most, therefore, of the German articles on school-fatigue do not apply to our school conditions. With our comparatively short school hours, there is but little danger of giving too much home-work of the right kind, or of beginning too early in the grades, if only the right kind of home-work is given. The kind of home-work is a far more serious question than the amount of it. The amount of material that can properly be developed and sufficiently drilled in the regular school recitations will not provide any too much work of the right kind for home-work. The overburden of home preparation comes from transferring to the unaided home-study what properly belongs in the school.

Every pupil should have a considerable time free to work at things of his own choice. He should browse in a good library, draw and paint every day, work at some manual work of making things, and, particularly, if he is less than fifteen years of age, he should have time for free play with other children. No system of education that omits opportunity for such self-activity is doing the best to develop the pupil's character. Although these things are not called home-work, they are as important to provide for as any assigned work.

The Socratic Method. Its Scope And Limitation.

By **James J. Reynolds**, Instructor, New York City.

To appreciate properly the spirit and comprehend the salient features of the Socratic method, a brief review of the social conditions which confronted Socrates, is necessary. He appeared at a time when "Reform" was the dominant cry. This "Reform" began by hinting that the State was not the only factor in life; and ended by denying the existence of the gods, and setting up the individual on a little pedestal, making his own private opinion the criterion of morality. Socrates takes issue with the high-priests of the new cult—the Sophists—and denies their contention that what is truth for one is not, necessarily, truth for another. "Truth to deserve the name must be true for everything and not depend upon individual peculiarities." Men reach different conclusions simply because they reason imperfectly; set them on the right track, and all must come to the same conclusion. He endeavors to bring about this general agreement by questioning all with whom he comes in contact.

By purposeful, clear, definite questions, he brings his disciples to see for themselves that their so-called knowledge is false, and, then, when he has them in the proper frame of mind, he attempts to replace the false ideas with real truth. But let us hear Socrates, as he questions a gentleman who "knows it all." "Glaucon, have you formed an intention to govern the State for us?" "I have." "An honorable ambition; and when you attain your object, you will be able to secure anything you desire, get positions for all your friends, be celebrated throughout Greece, and be an object of general admiration." Hearing this, Glaucon stays to listen. He is interested in the subject matter—an absolute requisite of successful teaching. "But it is plain that if you wish to be honored you must benefit the State." "Certainly." "Then, inform us with what proceedings you will begin to do so." Glaucon is silent. "Tell me whether you will endeavor to make it richer?" "Assuredly." "Would it be richer if its revenues were increased?" "That is, at least, possible." "Tell me, then," proceeds Socrates, "from what the revenues of the State arise, and what is their amount; for this you have doubtless considered, in order that if any of them fall short you may make up the deficiency, and that if any of them fail you may procure fresh supplies." "These matters," replies Glaucon, "I have not considered." "But, at least, tell me the annual expenditures of the State." Here again Glaucon is silent. And so, with infinite patience, and peculiar persistence, he leads Glaucon to recognize his lack of essential knowledge. The mind is prepared for the assimilation of new ideas, and Socrates now points out the paths which lead to a successful career. Note, (1) That the method is inductive. From the consideration of several facts, all pointing to one conclusion, Glaucon comes to a generalization; it is deductive, for after reaching this generalization Socrates leads him to see new relations. (2) It presupposes a definite aim on the part of the teacher and a clear comprehension of the subject taught. Unless certain of his ground, how could Socrates question with such skill? Behind the most insignificant of his questions lay a practical fact or truth, which he wished to elucidate. (3) The method has a negative and a positive bearing. The Athenian philosopher teaches us that nothing of value can be accomplished in teaching, until we first get rid of false ideas. The Socratic method performs the function of a clearing-house of the mind. On the "false-knowledge" checks it stamps "counterfeit," and throws them out; it passes on the "O. K." ones, to be taken up by the proper authorities. It prepares the way for the reception and assimilation of fresh ideas, and makes the pupil aware of the relations which the various contents of knowledge stand to one another.

Let us consider the limitations of our method. No amount of questioning, however skillfully put, or carefully planned, can evolve new material. No information or knowledge of facts not already in the mind can be brought out by questions. For example, take the word "seismograph," and try to develop a clear conception of its meaning by questioning. If we know in a general way the use of a seismograph, questioning by one familiar with the subject of seismology, may clarify its meaning, and help us to form a conception of its proper relation to geology and terrestrial physics; but until we have secured some ideas on the subject questioning is worse than useless. But you object that this is a peculiar word. So it is; but no more peculiar to you than many expressions thoroughly familiar to adults are to children. The theory that all knowledge is within the mind waiting to spring forth at the application of the proper stimulus does not apply to the sphere of positive instruction in which we, as teachers of the young, are mainly interested. The true Socratic method would consist primarily in a deliberation by teacher and pupil together, on ideas common to both; but where there are no common ideas such a course is impossible. Pursued with the spirit of Socrates, a line of questioning would result not simply in giving clearer distinctness to ideas, but would form fresh knowledge by making clear new relations. Those relations are not seen in the ordinary course of acquisition, and they must be recognized if the knowledge is to live in the mind.

Our discussion, so far, has not touched upon a very important feature of any teaching in the Socratic spirit, viz.: the necessity of insisting upon right and accurate use of words in the answers. His disciples were encouraged to voice their opinions, but he insisted on correct, forcible expression.

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The differences between the sexes so far as intellectual and moral functions are concerned are expressed in the following. Girls are more sentimental, their moral dispositions, likes and dislikes seem to be different from those of boys. They choose different games, (12) they prefer different occupations, they look differently at crime and punishment, (13) and in general have moral views quite different from those of boys. (14)

All these facts have undoubtedly a pedagogical bearing and have to be taken account of in the consideration of the methods of instruction and discipline.

During the period of accelerated growth the number of hours of instruction must be reduced, the subjects of study must be less difficult, and the teacher's demands more moderate. The period of accelerated growth begins with boys at 14, with girls at 12, hence the methods at this period are conditioned by the set of the pupils.

Another suggestion refers to the period of adolescence. Girls especially need great care during this period. Allowances must be made for their absences from the school, means must be provided by which they can easily make up for the lessons missed. During this period it is necessary to dwell upon the same subject for a longer time, and the progress of study must necessarily be rather slow.

The differences of sex must be considered in connection with the problem of physical culture. With boys we may employ short and difficult exercises, with girls exercises of a greater duration but requiring less muscular exertion.

Short-sightedness being so frequent among girls (15) would suggest the necessity of certain precautions against methods that strain the eyes. Reading from the black board, drawing from distant objects, etc., should be seldom employed in teaching girls.

From the very beginning of school life boys and girls possess different stores of conceptions. (16) Boys excel girls in the concepts of number, though falling much below them in the concepts of space. Girls excel boys in their knowledge of the parts of the body, of home and family life; in the knowledge of a square, a circle and a triangle, but not in that of a cube, a sphere and a pyramid. Their stories are more imaginative, while their knowledge of things outward and remote, their power to sing and to articulate correctly from dictation, their acquaintance with numbers and animals, are all less developed than those of boys.

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12). O'Shea, Interests of Childhood, Proc. of the National Educational Association, 1896—
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16). S. Hall, "Contents of Children's Minds."—Ped. Sem., Vol. I.

All this will affect the methods employed during the first years of instruction, which must be based upon former experiences. With a view to gaining the interest of the pupils, the teacher will have to take into account the peculiar likes and dislikes of boys and girls. In singing girls will more appreciate sentimental and sacred music. Boys, on the contrary, will be more inclined toward marches, patriotic songs and more lively tunes. In reading, boys will appreciate thrilling stories of adventure and of daring rescues; they will be fond of heroes possessed of courage, attaining greatness, etc. Girls, on the other hand, will rather sympathize with the poor and the weak, will enjoy the beautiful, the kind and the virtuous, will be interested in self-sacrifice and will listen with rapt attention to the marvelous and mysterious. In manual training, as well as in other studies, the boys will prefer the useful, the girls the charming.

Owing to their imaginative nature and to the extreme development of verbal memory, girls are more inclined to learn things by heart, to remember rules, without grasping the underlying principles. The teacher has to be very careful in this particular respect, which is especially important in teaching mathematics. It seems that girls are not able to master the number relations so well as boys are, and hence they need a more careful and slower presentation of the subject. On the other hand, in subjects requiring verbal memory, as, for instance, foreign languages, botany, etc., girls will require less drill, and less time, and the methods employed may be less complicated.

In teaching drawing we shall observe that girls are more inclined to go into detail; they will possess less skill in getting the general character of the drawing, but at the same time will have more patience to work out the minute details. Hence, the methods in instructing girls in drawing must be different from those employed in teaching boys.

The slow temperament of girls manifested in their reaction time, the lack of motor activity and their inferiority in strength, leads to the conclusion that discipline with girls is a matter of less importance than it is with boys. Besides, it is a well known fact that among the causes of disorder and noise in a class room the fatigue of the pupils is an important one. Since girls are less fatigued and are steadier than boys, they will always behave better than the latter. This is corroborated by the statement of many authorities.(17) At the same time the discipline with girls must be based upon different grounds from those considered with regard to boys. Boys need more frequent punishments, and possibly may gain through a system of rewards and prizes. Girls are extremely ambitious; they remember punishments longer than boys do, and it is easy to discourage them, to dishearten and to extinguish

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17). Report of the Bureau of Education, 1894.

further progress. Boys will obey strict orders, only they will sometimes need vivid proofs of the teacher's authority; they may appreciate in him physical power. Girls, on the other hand, will need gentle treatment. With them discipline may be based upon sympathy, love and affection.

The teacher's appearance, her or his manners, attire and language are important matters, especially with girls. The teacher's power to tell a story will play an important part in the instruction of girls, because they are more imitative than boys. The boys will appreciate in the teacher a ringing voice, the use of intricate sentences, strong words, motions and gestures; girls, on the other hand, will rather like a low voice, musical, pathetic and emotional. Boys are fond of artificiality in expression, girls cannot bear it. Girls appreciate a cheerful disposition in a teacher, but above all, naturalness and kindness.

The ambition of girls leads sometimes to results detrimental to their development. While it is very difficult to overwork a boy, it is easy to overtax a girl. This especially must be guarded against in home work. Girls will seldom confess that the lesson was too hard, and consequently the teacher may overlook the fact that the pupils are doing more work than is desirable.

In the matter of reading, girls are more apt to read books which are above their understanding. In general they will read more and understand less than boys. The teacher, while encouraging home reading, will have to control the reading of girls especially.

These are but a few suggestions illustrating the manner in which methods are affected by sex. Space does not permit us to dwell in detail on the subject. Our aim was only to show the relation existing between the sex of the pupils and the methods to be employed.

The Use Of The Blackboard.

By Rubic N. Roark, *Professor of Pedagogy, State College of Kentucky.

THE most important piece of apparatus in the school-room is the blackboard, with its accessories. If there is enough of it and it is of the right kind, the teacher who knows how to use t can, at a pinch, get along without much else wherewith to illus-rate his work.

The blackboard should not be *board* at all, and need not be lack, though that color is preferable. A composition material, esembling linoleum, and coming in rolls from which as much or as ttle as is needed may be cut, and put up or taken down at any ime, is best. It does not wear out nor crack, no special wall condi-ion is needed for it, and it has a most agreeable writing surface.

The crayons and erasers used should be dustless—when that ind is invented and put on the market. A supply of crayons of ur or five different colors should be kept on hand for special ork. Crayon holders are good in theory, but are not worth much practice. Of much more importance than crayon holders is a lace to keep the crayons when not in use. The arrangement offer-g the most convenience is a series of shallow boxes attached to e wall below the board, each one having a tray of wire netting f about a half-inch mesh fitted into it. This permits the dust and nd small pieces of chalk to fall through into the box underneath nd keeps the usable crayons clean. Of course, rubber-tipped ointers will be used; they are one of the means of lessening the eedless waste of nervous energy.

From the psychological standpoint there are two distinct values f blackboard work done by the pupils—one is direct, for the class; he other is reflex, for the doer.

For the learner every subject, or some part of every subject, hould be made concrete and objective,—should be so put as to press one or more of the senses. More and more importance is ming to be attached to the acquiring and storing of visual images; ore and more we realize that most of the best thinking, even in hat is usually called abstract subjects, is a thinking in visual ages. The apprehension of this truth by "the man in the reet," who knows no psychology, is evidenced daily by his eager rchase of the newspaper with maps, diagrams, portraits, and car-ons. Any piece of work on the board will set some matter in a w light for each member of the class, and fix it in his memory.

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The Making Of A Program.

By James C. Byrnes, Member of the Board of Examiners, New York City.

AN order of exercises properly made is a work of art. It presents a solution of a complex problem involving considerations both scientific and practical. The tests of its excellence transcend mere legal requirements, extending to the field of educational *science* and penetrating nearly every part thereof. The discovery of the principles involved in its construction, their application within prescribed limits, and their adaptation to varying conditions, constitute a distinct and definite problem. It is my purpose here to discuss that problem, and, possibly, to approximate a solution of it.

First, as to the limits of the problem. All professional teachers realize the force of the antithesis between time and work. "Too much to do, and too little time to do it in," is a common complaint. The remark accurately indicates the limits of our problem. Any set of pedagogical principles, whether of matter, method, or order, that may be agreed upon, are confined in their application to the prescribed course of studies; are further confined within yet narrower bounds by the conditions of the school's environment—e. g., the speech and the home influences of the pupils; and are limited as to time in three ways—in the necessity of completing the prescribed work of the grade within the school-term, in the restriction of the daily session to five hours, and in the "minimum time" fixed for the separate studies. To meet these conditions in making an order of exercises, to fill in the time with the prescribed studies of the grade, is merely an arithmetical problem. It is not the pedagogical problem. The teacher that prides himself on being "practical" may boast that he has solved the latter problem in doing the former. Yet even he observes common-sense principles. He would not for a moment think of placing a week's work in arithmetic within the confines of one morning; no more would he have a writing lesson immediately after a drawing-lesson. He will observe the duration and the sequence of the exercises; and thus he attacks the larger problem. He becomes a "practical" physiologist and psychologist by his observance of principles deep-rooted in the two sciences. Most of us in daily life observe and practice the common truths of physiology; all of us are students of psychology. Notice the attractive advertising signs, look again at the shop windows, and consider whether the merchant has any acquaintance with the phenomena of "attention" and "interest." The child that ties a string about his finger to remind him of some duty to be performed betrays a glimmering insight into the great laws of association and their bearing upon memory. Likewise the practical teacher in arranging his program recalls his observations as to the time of the day when his pupils are most susceptible to his instruction, and places in such time the most difficult exercises. He may take further steps in the same direction by a methodical inquiry into the rationale of such imperical principles and a systematic search after other truths less obvious to the ordinary observer. Here it is evident that he has passed beyond the arithmetical problem and considering the child-nature in its physiological and psychical aspects. Immediately a wide field of investigation opens before him notwithstanding the limits of matter and time prescribed by authority.

Let us, therefore, consider: first, in what ways a regard for the mental organization of the child may influence the duration and sequence of the exercises prescribed; and second, in what ways a regard for his physical organization may influence them; finally, how may the environment of teacher and child influence them. The guiding aim throughout is the economy of force, the prosecution of the teacher's ends along the line of least resistance.

Does psychology give us any counsel as to the duration of the various exercises, as to the best times to engage in them, and as to their sequence? Is there any limit to the duration of an exercise? Obviously, there is—a minimum and a maximum. How are these limits determined? Are they the same for all exercises? These are questions every teacher must answer. The fundamental condition of all learning whatever is the attention of the learner. The observed facts of attention are significant. There are all degrees of attention from the dim, flickering consciousness of the ticking of the clock or the scratching of the pen, to the highly concentrated effort of attention on a mathematical demonstration or the effort spent in recalling an almost forgotten name. The important facts to be noted here are that the highest degree of attention is accompanied by a feeling of strain, that a distinct effort is necessary to sustain it, that a sense of fatigue is soon experienced, and that finally further efforts to attend are unavailable. The lower degrees of attention, on the other hand, expend little energy and induce no appreciable fatigue. Its extreme ebb rather gives rise to a feeling of *ennui*, often anomalously termed "a weariness of doing-nothing." Then we welcome anything that will engage our attention. How pleasant are the intervals of low-ebb attention after a prolonged effort of concentration. As we relax control of the flow of ideas, we may open the door to Fancy who, unchecked, with

"Quips and cranks and wanton wiles,
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soon drives dull care away. Like a colt just out of harness, the mind disports itself in idle play. This period of rest restores and reinvigorates the enfeebled powers however, and we may again direct the attention to the task at hand with confidence that it will follow our guidance. It is evident that no exercise requiring a high degree of attention should be prolonged to the point of fatigue. At that point, the attention is inconstant, fickle, wandering, utterly nullifying the teacher's best efforts. This fact then fixes the maximum duration of an exercise. And then, what: Such absolute rest as sleep affords is not practicable in school, even if it were necessary. Neither is there time or necessity for Fancy's wild gambols. But comparative rest from the intensity of concentrated attention *is* necessary, and has wisely been made practicable. An exercise in arithmetic may be followed by one in reading, the mind thereby passing from a higher to a lower stage of voluntary attention. Here we are anticipating the question of sequence which we shall discuss more fully hereafter.

The next step in our inquiry is to seek a reply to the question: What exercises are the most exhausting to the attention? If considered as applying to the "mechanical" memory merely, Bain's proposition that the fixing of impressions on the memory is the most difficult of mental tasks, is, we believe, sound. While skilful teachers prefer not to build on the "mechanical" memory, yet, as Professor James points out, its function is important and really necessary. It is one of the virtues of the Herbartian lesson-plan that little dependence is placed on the mechanical memory; each new impression is woven into the texture of experience by the activity of the understanding in comparing, abstracting, and relating. Even in the fixing of a series in the memory, resort is taken to the "ingenious" memory.* Again mechanical drill and review are discountenanced by expert teachers who seek in each review some new principle on which to relate the recalled impressions. These considerations weigh against the treatment of any exercise as one involving merely the mechanical memory.

To commit to memory the words of a literary composition, the steps of a process in arithmetic or geometry (e. g. subtraction, long division, the Pythagorean theorem), the meaning of an obscure phrase in a foreign tongue, or a geographical series (e. g., the States of the Union), drains the nervous force to the point of incapacity for further exertion. Instances of protracted effort in memorizing where the jaded powers have been stimulated by strong desire, are not uncommon; yet such rare cases do not qualify the main proposition that the retentive faculty exacts a larger contribution of cerebral energy than any other mental process or power. Nor is the explanation of remarkable memories inconsistent with this conte phenomena of "attention" and "interest." The child that ties a string about his finger to remind him of some duty to be performed betrays a glimmering insight into the great laws of association and their bearing upon memory. Likewise the practical teacher in arranging his program recalls his observations as to the time of the day when his pupils are most susceptible to his instruction, and places in such time the most difficult exercises. He may take further steps in the same direction by a methodical inquiry into the rationale of such imperical principles and a systematic search after other truths less obvious to the ordinary observer. Here it is evident that he has passed beyond the arithmetical problem and considering the child-nature in its physiological and psychical aspects. Immediately a wide field of investigation opens before him notwithstanding the limits of matter and time prescribed by authority.

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*See plan for memorizing a poem, De Garmo, Essentials of Methods, §56.

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and re-cross. Nevertheless the recognizable differences among the various exercises whether arising from the subject-matter or the method of treatment, warrant the grouping of them under the three classes outlined above.

But there is a further limitation to any attempt at classification. The mental powers do not appear simultaneously but are developed in a complex way from the earlier forms of mental activity. Hence an exercise difficult to a child of seven years may be easy to a child of twelve. But the one factor universal and omnipresent in the mental life is attention, and it is on the varying degrees of its intensity that our classification is based. We present it as only relatively and qualifiedly true to the facts :

SUBJECTS—PRIMARY.	CLASSES OF EXERCISES GRADED ACCORDING TO ACTIVITY OF ATTENTION.	SUBJECTS—GRAMMAR.
1. First Steps in Reading, Writing and Drawing. 2. Spelling. 3. Memory Gems. 4. Arithmetic.	A. Exercises involving the memory, largely.	1. Definitions and Rules. 2. Recitations in all Subjects. 3. Memory Gems. 4. Arithmetic, etc.
1. Sentence, Building. 2. Manual Constructive Work. 3. Observation Lessons.	B. Constructive and Analytical Exercises.	1. Grammatical Analysis and Syntax. 2. Use of Words. 3. Composition. 4. Drawing — Mechanical and Design. 5. Observation Lessons. 6. Manual Constructive Work. 7. Study.
1. Practice in Reading, Writing and Drawing. 2. Drill. 3. Music. 4. Physical Exercises.	C. Mechanical Arts.	1. Practice in Reading, Writing and Drawing. 2. Drill. 3. Music. 4. Physical Exercises.

Geography and history are not specifically mentioned in the classification for the reason that their adaptability to interesting treatment entitles them to separate consideration. The well-known effect of interest on attention removes a subject capable of interesting treatment from the category of those studies which require the highest degree of active attention. For this reason, it may not be amiss to say a word here concerning the manner in which the feeling of strain—the usual accompaniment of concentrated attention—is allayed or banished by interest in the object to which we are attending. To illustrate: I am listening, rather bored, to a lecture on literature; I follow the lecturer with difficulty; my attention wanders, every slight noise in the hall or in the adjacent street distracts me. But suddenly a familiar name strikes my ear—the lecturer is illustrating his point from a novel I was reading the night before. I am at once interested ; I follow the speaker with eagerness and ease ; people enter and people leave, the sounds in the hall and street grow louder, my neighbor brusquely pushes past me—but none of these occurrences distracts me. Until the interest flags, I am rapt in breathless attention. I am "all eyes and ears," my muscles are rigid, yet I am conscious of no strain. The feeling of interest has sustained the attention without effort and with little outgo of mental force. It has changed the character of attention from a purposeful, directed effort, enervating and irksome, to a spontaneous, almost involuntary surrender of the faculties, without strain and without fatigue.

Such subjects as history, geography, and nature study, when presented in an interesting way may thus serve to arouse the attention when a lesson in arithmetic or grammar would be followed fitfully, with wandering attention and unrest. Hence the presentative treatment of these subjects is included under "observation lessons" in the above schedule. This presentative treatment establishes lines of association by means of which the names of rivers, cities, etc., are easily remembered. On the other hand, the learning of lists of such names is properly put among the memory-exercises. We must therefore regard history and geography as belonging not under any one rubric but under all three.

The place of the study-period in our table really depends on how the time is employed. Since it is frequently employed in noting, in tabulating, or in applying old judgments to new data, we have placed it among the constructive and analytical exercises.

With these reservations, our table indicates the order of difficulty in the various class-exercises as fixed by the stress of attention, and consequently their relative duration as fixed by the point of fatigue. But if, on the one hand, no lesson should be so long as to enfeeble, on the other hand, no lesson should be so short as to make the work fragmentary. Every lesson should be long enough (1) to show its connections with what has gone before, and (2) to allow the development of full and clear ideas on the topic presented. Furthermore, it should be long enough to permit the pupils to contribute something, either to do what has been explained, or to repeat what has been said.

In the beginning of school-life the power of voluntary attention is feeble. Ten and fifteen minutes are probably reasonable limits to the duration of an exercise in writing or in numbers in the lowest primary grade. The exercises below these in our table may last from twenty minutes to a half hour, but no exercise should ever be longer than thirty minutes. Little variation from these limits is advantageous in the three lowest primary grades. In the higher primary grades, the exercises in penmanship and drawing may be extended to forty minutes. It is always better to have two exercises a day in one subject than one exercise so long as to produce inattention and weariness. In the primary, the day, so far as practicable, should be the cycle within which the round of studies is made. In the grammar, the week may advantageously be made the unit. In the first two years of the grammar school, all recitations lessons previously learned should be limited to twenty minutes.

The same limit will apply to the advance-lessons in arithmetic, though the whole exercise, including drill in applying the principle taught, may cover forty-five minutes. Exercises in Class B in our table should be limited to a half hour. Hence lessons in mechanical drawing and composition would be divided into two exercises. The writing of the composition can be better correlated with the lesson in science, geography, or history which supplies the topic, than with the exercise in correcting errors.

Very interesting exercises in history and geography may occupy forty-five minutes when part of the time is occupied in exhibiting specimens and pictures, or in map-drawing. Drawing and other exercises in manual training are generally given in periods of one hour each. But the pupils frequently show signs of weariness before the hour has passed. However, the waste of time in the distribution and collection of the materials justifies the limitation of the number of periods. From the fourth through the first grammar grades, the time devoted to the several exercises may be somewhat larger than that occupied by the same subjects in the lower grades. Generally speaking, however, no exercise should exceed three-quarters of an hour in duration, except penmanship and drawing. But correlated lessons involving two or more exercises, such as reading and grammar, or geography and composition, may occupy a full hour.

The duration of the various exercises having been determined, the next step in our inquiry is to consider the order in which they should occur. Obviously, two long and difficult exercises should not occur in succession. The principle of fatigue requires that the strain of attention be relieved. Since absolute rest is impracticable in school-time, relief is partly obtained by a change to another exercise, as from arithmetic to reading, or from sentence building to writing. This is the principle of alternation. In general terms, it requires that the exercises lowest in the schedule be alternated with the highest, the concrete with the abstract, the passive with the active, observing with doing, one sense with another, books with things. The exercises in penmanship, dictation, drawing, reading, music, and calisthenics, should be interspersed among the recitations and other difficult exercises.

The chief diversion of the school-day is the noon recess. Ther the mental excitement is abated and the attention is deflected int other channels. The brain is rested while the body is exercised The blood is drawn off from the brain to the muscles and digestiv organs, and the arrested oxidation of the tissues is again stimulated. The same revolution in the vital forces takes place afte school is dismissed for the day. There is no good reason therefor for placing an easy exercise such as penmanship or vocal mus immediately before the recess or the afternoon dismissal. Remi sion in the stress of attention may be found within the limits what will appear on the program as a single exercise, as from reading numbers to writing them, from listening to a narrative to repeating it. A mere change in the subject-matter of consecutive exercises, even when they are of equal difficulty, somewhat relieves the strain ; yet it is a safe generalization that two difficult exercises should not occur in sequence.

The principles applying to the duration and order of the school exercises have grown out of a consideration of the mental life and organization of the child. A like regard for the child's physiological organization will bring to light other valuable elements tending to a solution of the problem before us. The chief physiological condition of all mental activity is a sufficient supply of aerated blood. If the blood be diverted to the digestive organs in the work of assimilating nourishment, or to the muscles in the work of repairing tissues, the brain is incapable of supporting a vigorous mental life. If the pupils have eaten a hearty mid-day meal, then for the first hour of the afternoon session the physical organism is actively engaged in the process of nutrition. Hence an exercise low in the scale of active attention, such as penmanship or drawing, may advantageously be placed in that period. Conversely, we may expect the maximum of cerebral energy to appear when the body and brain have been rested and nourished. It is not surprising therefore that in the second and third hours after the first meal of the day, the mind is at its best. The nervous forces have been replenished by the night's repose, the digestive processes are quite consummated, and the accumulated vital forces are held in suspense. On the high-tide of this flow of vigor, we shall launch our heaviest craft. Let the first and second hours of the morning session be employed in those studies which require the highest degree of active attention. The powers of perception, memory, and judgment may then be evoked with the maximum effect. As the day advances, the nervous energy subsides.

Further considerations, of a practical nature, may be kept in view by the teacher in making an order of exercises, both with the desigh to catch the right tide in the fluctuating flow of the pupils' powers, and to economize time. Thus exercises such as drawing, writing, etc., may well be held in the first hour of the afternoon session, because the noon recess permits the distribution of the necessary material without loss to the school-time. Again, arrange the lessons in which home-work is given so that an equal amount of such home-work may be given for each day. Experience seems to show that the first school-day of the week is the most favorable for written or drawn home-work to be handed in, and the least favorable for the recitation of lessons learned at home. The reasons may be easily divined.

The business of making a program should be performed in the full light of the principles set forth above. Begin by arranging a table of the prescribed studies of the grade and the minimum time per week allowed for each, including the opening exercises and the dismissals. Reserve an hour as "optional" for such work as is not comprehended in the ordinary routine, as an exhibition of specimens or the reading of an interesting book. Divide the time allowed for general headings (e. g., language) into what seem to you as the proper proportions for its several parts (e. g., reading, spelling, composition, etc.). This will bring to light the places where the minimum time allowed is inadequate. Examine the list of studies carefully to see what subjects may be regularly correlated. Experience is required to do this judiciously, but a moderate degree of boldness in making experiments in this direction is commendable. Substitute the correlated pairs or groups with their total time allowance for the chief units in the several groups, striking out the time allowed for the other units. The remaining time may then be apportioned among the various studies as the judgment and experience of the teacher seem to direct.

Here no rigid rule can be laid down. The nationality and home-life of the pupils may require variations in the time allotted for language, for instance, and other accidental factors may suggest a yet different distribution. Divide the total time allowed for each subject into periods of the proper duration so far as practicable. It is not necessary to have all the exercises in the same subject of the same duration so long as all are within the limit of time fixed by psychological laws.

The material is now ready for blocking-in the time-table. First arrange the exercises into groups for each day putting down the regular diurnal exercises first. So far as practicable separate the exercises in the same subject by equal intervals. Thus if you have three lessons per week in geography, set them on Mondays, Wednesdays, and Fridays. Some rearrangement may be necessary to distribute the home-work evenly. Apportion the written-work whether in copy book, dictation, composition, or written-spelling, equally. Then rearrange the exercises in the proper sequence with due regard for the laws of alternation and the concentration and remission of attention; divide into morning and afternoon sections, and the time-table is complete. This work of arrangement must necessarily be conducted in a spirit of compromise. Theory is one thing, practice another. It is likely that in the course of the work, several exercises will be lengthened or shortened, but the final result will be an approximate solution of a complex practical problem.

The duty that remains is to follow the program punctually, as a covenant too rich in its advantages to be lightly violated.

what will appear on the program as a single exercise, as from reading numbers to writing them, from listening to a narrative to repeating it. A mere change in the subject-matter of consecutive exercises, even when they are of equal difficulty, somewhat relieves the strain ; yet it is a safe generalization that two difficult exercises should not occur in sequence.

The principles applying to the duration and order of the school exercises have grown out of a consideration of the mental life and organization of the child. A like regard for the child's physiological organization will bring to light other valuable elements tending to a solution of the problem before us. The chief physiological condition of all mental activity is a sufficient supply of aerated blood. If the blood be diverted to the digestive organs in the work of assimilating nourishment, or to the muscles in the work of repairing tissues, the brain is incapable of supporting a vigorous mental life. If the pupils have eaten a hearty mid-day meal, then for the first hour of the afternoon session the physical organism is actively engaged in the process of nutrition. Hence an exercise low in the scale of active attention, such as penmanship or drawing, may advantageously be placed in that period. Conversely, we may expect the maximum of cerebral energy to appear when the body and brain have been rested and nourished. It is not surprising therefore that in the second and third hours after the first meal of the day, the mind is at its best. The nervous forces have been replenished by the night's repose, the digestive processes are quite consummated, and the accumulated vital forces are held in suspense. On the high-tide of this flow of vigor, we shall launch our heaviest craft. Let the first and second hours of the morning session be employed in those studies which require the highest degree of active attention. The powers of perception, memory, and judgment may then be evoked with the maximum effect. As the day advances, the nervous energy subsides.

Further considerations, of a practical nature, may be kept in view by the teacher in making an order of exercises, both with the desigh to catch the right tide in the fluctuating flow of the pupils' powers, and to economize time. Thus exercises such as drawing, writing, etc., may well be held in the first hour of the afternoon session, because the noon recess permits the distribution of the necessary material without loss to the school-time. Again, arrange the lessons in which home-work is given so that an equal amount of such home-work may be given for each day. Experience seems to show that the first school-day of the week is the most favorable for written or drawn home-work to be handed in, and the least favorable for the recitation of lessons learned at home. The reasons may be easily divined.

The business of making a program should be performed in the full light of the principles set forth above. Begin by arranging a

It is a very great mistake to impose a ready made detailed syllabus on any teacher, even the youngest. It is a very great mistake to miss an opportunity of evoking cheerful and interested, because original, energy. Curiously enough, while the pedagogic doctrine of Interest is gaining more and more acceptation, there is an equally marked tendency in some quarters to lay down cast-iron sequences, not only of studies—which may be defended on good grounds—but of subject-matter in these studies. Yet, after all, it must be of importance to the success of a plan of instruction that the instructor should have a real sense of ownership and personal concern in it. The bane of reformers has always been finalty, as Huxley used to say; the vice of Herbartianism as interpreted by some enthusiasts in these days is over-elaboration, devotion to the letter rather than to the spirit, the imposition of artificial and even fantastic plans of study.

The English national code for primary schools which in past times has acquired a not undeserved fame for rigidity, has been year by year greatly relaxed; and now most of the syllabuses propounded are specifically set forth merely as suggestions. It is perfectly well known that teachers are at liberty, they are even invited, to propound syllabuses of their own, subject to the approval of Her Majesty's Inspector.

This clearly involves a very salutary principle. Let the teacher have general directions about the "subjects" he must provide for if you like; but let him think out his proposed plan and scope for himself; and then let the authority which has cognizance of a wider area, which knows what is done in a hundred other places offer suggestions and criticisms. The highest authority (to use our convenient military metaphor) will lay down what shall be his "objective;" his proposed strategy may be subject to criticism; his tactics or procedure must be his own, for no one but himself can face the class and give it "instruction."

We must beware of excessive systematization. Most of the elaborated plans of instruction offered to us by ardent "educationists" take implicitly for granted what is emphatically false—that every mind is like every other mind, that every member of a class is like every other member, every class like every other class, the rate of progress always and everywhere the same. Probably the truth most frequently brought home to the practical teacher is the extraordinary way in which the various objects of his beneficent operations differ among themselves. If we could only once really get ourselves to believe that the significant facts in education are the divergencies of individuals from the type, we should more certainly cease to deal with pupils as if they could all be settled at the same time with the same formulas, to imagine that the same Plan and Scope Book will suit all circumstances. We must vary our plans according to the needs of the week, the day, the hour, the moment. We ought to know to what point we are tending, but there is neither a royal road nor a high road to learning. On the other hand when we are moving troops in great numbers we are tied to the highways; when we are dealing with large classes, we must be more rigid in our set procedure than if we have only one pupil or very few. It is therefore important for a class teacher to map out his ground with some solicitude. The larger the numbers we have to deal with, the more perplexing and cumbersome the inevitable machinery.

But a class may make progress with more or less rapidity than the teacher expected. It would then be a monstrous mistake to keep close to the original plan just because the work had been so distributed in its projection. This is, indeed, one of the evils of external examination; the teacher may even think that his pupils are covering too much ground just because they are pushing beyond the area included in the syllabus of examination to be held by an external authority. In a case like this, the teacher ought to carry his pupils boldly over the lines, which he can do with safety and profit, while at the same time, by judicious repetition and occasional prodding, he can keep his lines of communication intact, and ensure that his rank and file come up to the examination in proper condition to meet that particular test.

This is best done by working in concentric circles; the circles will be wider at each stage of our teaching, but we shall be careful from time to time to assure ourselves that our core is sound. We must distinguish between the concentric curriculum, however, and the concentric year's course. In devising a curriculum covering several years we begin most profitably with what is least minute; but in the smaller divisions we may work with more particularity. Thus, in teaching History, it would appear to be most profitable to teach little children the main facts in world history roughly and in outline, of course, and mostly by means of interesting lives of personages. From this core you start your several circles of history-teaching in general. You give biographies, your children read epics, they learn about Greeks, Romans, Hebrews, with little particularity or minuteness. Round this centre you draw wider circles of history becoming more and more specific, always maintaining connection with the general history that served as your starting point. It is not necessary to be too rigid. With such variations as a teacher may prefer, a curriculum of a ten years' course might be devised.*

Within the circles so constructed, though the process of concentring is of less importance, concentring is often unnecessarily neglected in favor of sequences. Thus, in teaching national history, it is quite worth while to fix a central pivot by means of a score or more of dates committed to memory. The foundation is necessarily rigid, but it is the more serviceable by reason of that fact, particularly if the pupil has already learnt, by means of biographies at an earlier stage, to consider the personages mentioned as human and interesting, though their place in time is fixed. Political history may then proceed in sequences, one fact after another; then another circle is made by going over the same period from its social and literary side, separately or together, in sequences.

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* N. B.—A given course may be made to cover one or more years, or may be contracted. The point of most importance is that each outer circle should be more particular and detailed than its inner neighbor.

The same process, *mutatis mutandis*, is profitably followed in teaching other subjects. Suppose, for instance, the set subject is English literature. In early school life, this, of course, is merged with history, reading, recitation, and so forth. Gradually the study specializes itself, and in the "teens" the time comes when (say) a play of Shakspeare is to be tackled. From what centre shall we start here? My experience assures me that we should first go rapidly over the play *as a whole*, a thing to be "taken in," as it left the writer. We must try to see it with the writer's eyes. Then we make another circle and examine the play in detail, first for its æsthetical and then for its rhetorical qualities; and finally we go through the play a third time in sequence, line for line with an eye to its philology and grammar. The golden rule seems to be to proceed from that study which has the most general, all-embracing, application, and to end with the particular, with the minute verbal analysis. It is bad teaching to start with analysis.

No rules can possibly be laid down as to the construction of the Plan and Scope Book for every subject. The teacher's plan must be determined by the condition of the class and his own conception and grasp of a subject. But he ought to set out with a definite project to compass a definite mass in a given time, and he should record for his own guidance at each date how much he has done or how much fallen short of what he proposed. Above all things he ought not to use any other person's syllabus slavishly. Let him look at his neighbor's syllabus for inspiration, and burn all Notes of Lessons that are not his own.

What, generally speaking, should one's Plan and Scope Book contain?

The best arrangement would divide itself into three parts:

1. Under a properly thought-out scheme, the curriculum followed in a school should be an organic whole, each part related rationally to other parts. It is possible, of course, to push the principle of connectedness to violent and ridiculous excess, and some of the pseudo-Hebartian schemes are open to grave reproach on the score of pedantry and fancifulness. But such complementary subjects as History and Political Geography should proceed *pari passu;* Mathematics should not be a stratified series of first Arithmetic, then Algebra, and then Geometry, and so forth, but

Mathematics, every method of treating a mathematical subject being applied where it illustrates and completes another.

But we are driven by convention and by examinations, the expressions of convention, to accept in most cases the principle of stratification, involving a sequence more or less illogical, so we must generally accept our main syllabus as it is provided for us. If in a given year we must deal with the Geography of America, North and South, we must recognize the fact and set ourselves to teach it as well as we can. If we must treat the History of America for one year as a thing apart, though it means little to us apart from general history, we must face it.

2. We then make up our minds to deal with the subject either as a system of concentring circles, or in simple sequence. There are ample hints for the combined procedure in the monographs already published in this series and elsewhere. In any case, the Plan and Scope Book should set forth what the teacher proposes to do in each quarter of the year, providing always for ample recapitulation to be obtained, as much as possible, by continuous oral or written work *from the pupils*. It is here that we should keep care- ecord of (*a*) the ground proposed, (*b*) the ground covered, and (*c*) he apparent result in the tested knowledge of the class considered ndividually and collectively. This gives the teacher an indispen- able means of checking himself and also of guiding this or that pupil when the time comes for final revision. Sections 1 and 2 hould be considered and completed before the opening of the ession's work. They constitute the plan of campaign. The next ection is best constructed as the work develops in practice.

3. The teacher makes, preferably in separate book, notes of the topics and illustrations—arranged with an eye to "method," that is, to logical development—which he will use in each separate lesson. In manipulating these he will depart very freely, if necessary, from the written plan. He will provide for some form of research work on the part of his pupils, giving them things to "look up," especially points not treated by himself. The discussion of these will probably induce him to modify subsequent Notes of Lessons, and he will be more truly educating his pupils thus than if he rigidly followed a plan, however good, devised beforehand, however skilfully.

It is the mark of a good teacher to be able to discriminate between the Method that is essential and permanent, and the Devices and Procedure that must vary with varying circumstances. He gets at the first by a reasonable study of the logical and psycho- ogical bases of teaching in the light of the history of education, and at the latter mainly by the wit and tact which we call sympathy.

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The Progress Book.

JOHN P. CONROY, Principal, New York City.

THE purpose of the progress book is the presentation in succinct form of the work done in the subjects of the grade during the period for which the book is made up, so that an intelligent idea of the class work, both as to the matter and the order of its development may be conveyed to the supervising official, superintendent or principal. In addition, its purpose is to give the teacher a comprehensive view of the field traversed in the period, so that in future omissions may be supplied, and errors in apportioning work for the time, or in the order of presentation, may be corrected. It should exhibit, when finished, the teacher's conception of the practical organization of the class work.

It is analogous to the ledger of the merchant, wherein are summarized the transactions of business; and as to the ledger other books containing these transactions in detail are tributary, so it is reasonable to suppose that other books or records are kept that will show in greater detail the work of the class, generalized in the progress book.

Usually, the work of each grade is divided into monthly periods—five in all in the term—and the progress in each period is written up and submitted to the principal. This division of the work demands that the teacher shall carefully consider the requirements and the limitations of the grade, arrange the order in which the work is to be presented and the time to be given to its various divisions; in other words, a systematic plan of the work to be covered in the term and in its periods is to be outlined at the beginning. While this plan for the term work involves at first some labor on the part of the teacher, it saves much haphazard effort during the term and makes the work of the teacher more effective. The plan is, of course, not inflexible, but may be changed as circumstances require; it is simply a provisional guide. Nor must it be made in such elaborate detail that it contains an itemized account in the teacher's handwriting of every matter that is to be brought out in every subject of instruction. While such a plan, usually of daily work, may be made, and has been made, its use is generally for other purposes than to assist the teacher in assigning work to particular periods, in order that grade requirements may be covered in time. It is presumed that the teacher prepares the daily work; in the plan here meant an apportionment of the work in outline only

Mathematics, every method of treating a mathematical subject being applied where it illustrates and completes another.

But we are driven by convention and by examinations, the expressions of convention, to accept in most cases the principle of stratification, involving a sequence more or less illogical, so we must generally accept our main syllabus as it is provided for us. If in a given year we must deal with the Geography of America, North and South, we must recognize the fact and set ourselves to teach it as well as we can. If we must treat the History of America for one year as a thing apart, though it means little to us apart from general history, we must face it.

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3. The teacher makes, preferably in separate book, notes of the topics and illustrations—arranged with an eye to "method," that is, to logical development—which he will use in each separate lesson. In manipulating these he will depart very freely, if necessary, from the written plan. He will provide for some form of research work on the part of his pupils, giving them things to "look up," especially points not treated by himself. The discussion of these will probably induce him to modify subsequent Notes of Lessons, and he will be more truly educating his pupils thus than if he rigidly followed a plan, however good, devised beforehand, however skilfully.

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heading would be recorded by topics, or otherwise, the required work in geography, history, etc.

Under the heading for the selections memorized for recitation and declamation should be entered the name of the author, the title of the selection, and how much of the selection had been taught. The sets of synonyms should be entered in full, but the entry for the meaning and use and spelling of new words should be made by reference to the lists arranged by the teacher. The titles of the compositions will generally be sufficient to indicate the work called for by the course of study. By topics and subdivisions may be exhibited, under the appropriate headings, the matter and the order of presentation of the science, the geography, the history, the sentence study, the English grammar, and the arithmetic of the grade. In the manual training part of the course, the sequence of subjects and the amount required of each are already provided. In arrangement, the subject heading should be placed at the top of the page, a margin being left at the side for the month, and the rest of the page used for the entry of the progress, expressed as suggested.

In assigning space for the subjects in the blank book used to record the progress of the class, allowance should be made sufficient to permit the entry of each month's progress directly after the preceding month's, so that there be no intervention of other subjects, compelling reference to other parts of the book. In this way, a continuous statement is presented, facilitating inspection.

The progress book of the preceding term or terms may often be consulted with advantage by the teacher, as it may give hints of better order of presentation, correct errors in the assignment of lessons, and impart clearer ideas of the time necessary for the mastery by pupils of certain subjects, and in this way improve the planning and the teaching of a future term's work. To lay it aside after the term is finished, and not again to consult it, is to lose what lesson it may teach of errors made, and likely again to be made, which might be avoided, and of improvements possible to assist the teacher and benefit the pupil. It should be considered as a means of help to the teacher, and not alone as a book for the facilitation of inspection by a supervising official. Reference to past term progress books should be made especially by young teachers, and by those who have not had much experience in the grade.

Care and neatness in the arrangement are taken for granted. The progress book is the log of the class in its course through the term; in consequence it receives frequent inspection from supervising officials, and should be a reflex of the teacher's habits of work

The Records of Individual Pupils.

By JOHN F. CONDON, Principal, New York City.

THE teacher who wastes valuable time, during school hours, in continually marking recitations instead of using that time for instruction, does not fulfil the obligations for which he or she was placed in the class-room.

From interviews with men who have achieved success in educational work, it is apparent that no two persons will agree on all points concerning a marking system, or a method of keeping the records of individual pupils. One may search the works of many authors on class discipline, management, methods and principles of pedagogy, without finding even one-half of a page devoted to the subject of marking pupils in a class for class work. They evidently did not think the subject of much importance, or they desired that each teacher should work out a method, which would suit the conditions of each neighborhood; and in fact nearly every community has its own peculiar style.

The individual teacher going through a daily routine for the purpose of raising a number of pupils to the highest possible standard (mental, moral, and physical) must virtually be a "ways and means" committee to report progress at certain stated intervals regardless of environment. If all pupils had the same ability, or were equally stung by the pangs of conscience in the matter of performance of duty, there would be no necessity for keeping an individual record of pupils, and the teacher's task would be light. But since there are pupils who lack ability, or who are below even a fair average, a history of each one is absolutely necessary.

The true teacher learns the strong as well as the weak points of his pupils in every subject after the class has assembled but very few times. This knowledge is important, not only for class standing, but because it becomes an important aid in the business or professional life of the pupil when recommendations are sought; a fact too often neglected. The school authorities in all sections of the country should demand that the teachers' records of individuals should be preserved even after the class has passed beyond their guidance in the school. Since individual records must be kept, unless they are properly kept, gross injustice will be done, the individual rights of pupils will be taken away or infringed upon, and such proceedings always lead to dissatisfaction. The cause of education demands that most of the time during school hours shall be spent in instruction, and all things which tend to divert the teacher's attention from that task should be reduced to a minimum time.

In order to show that erroneous methods of marking exist, I will mention a few different ways which have been noticed, viz.: (*a*) Useless and frequent marking during recitation; (*b*) Monitors attempting to estimate the value of answers given, when they themselves are deficient and very often dishonest; (*c*) Teachers deducting marks for recitations on account of misconduct; (*d*) The teacher dividing attention between a text-book and a book-slate, while totally unmindful of the subject matter of the recitation or the one who is reciting. Such methods, which have robbed pupils of too many unreturning minutes, have evil consequences too well known by all active, progressive teachers for me to need to dwell upon them. Let it be sufficient to say that more injustice is done to the pupils by such marking, and more bitter hatred is aroused in the hearts of the future citizen than all the good qualities of the class teacher can counterbalance.

No monitor should ever be allowed to record a single mark against any of his classmates, for it is a very difficult thing to find one who is so bright that he might judge accurately or even approximately in this matter, or who would not rate standing in accordance with the amount of candy, sweet-wood or any other esteemed delicacy that is very often used as a weight in the scales of justice. The teacher is the sole judge of a pupil's record, and his judgment can be only approximate.

But the question arises: When shall the teacher mark? My opinion is that once a month will cover all requirements, and the record should be taken from memoranda made by the teacher after questioning, investigating, instructing or reviewing. Memory and attention to the class conditions will form important factors in making this estimate.

This record should be made known to the Class, and to the parents who are interested in their children, and should hear their standing in class at least ten times during a school year. By this method pupils learn from their teacher all of their deficiencies, and thus have an opportunity for improvement.

The next question that naturally arises is,—How shall the records of individuals be kept? In order that this question may be answered in a practical manner let us divide the subjects to be marked under six separate headings: (1) Lateness; (2) Absence; (3) Manual Work; (4) Language Work; (5) Number Work; (6) Conduct.

These six headings are taken because they include almost every subject, in which there is any necessity of a record.

(1) Lateness can be designated by the letter (l) which may be placed opposite a pupil's name when he enters the class-room.

(2) Absence can be marked (a) when it occurs, with the cause of absence marked as follows:

C. D.—Contagious disease ; *R.*—Religious services ; *S.*—Sickness, etc.

(3) All manual work, penmanship, composition, dictation, drawing, etc., can be arranged in piles in the order of merit, provided that the teacher so arranging them, has due regard for the individual pupil's ability, effort and result. Since every teacher is supposed to inspect work during its progress, this work of arranging can be done by the teacher while examining the different specimens.

(4) The language lessons, such as reading, history, geography, grammar, meaning and use of words, and nature work can be recorded once a month under the headings of excellent, good, fair or poor, such records to be taken from the teacher's memoranda.

(5) Number work shall be recorded under two separate headings, viz., oral and written, and each record should be excellent, good, fair or poor. The "ten or failure" system of marking should not be practiced in any class-room where there is any pretension to fairness.

(6) Conduct marks should be marks for conduct although I have known teachers who marked their pupils failures in lessons for speaking during recitation, and the parents of such pupils were misinformed regarding the intellectual standing of their children. One month will be a sufficient time to rate a pupils conduct, if the teacher can tolerate his presence in the class-room; if not his parents should be notified without delay.

There are hundreds of earnest, honest, hard-working teachers, who believe that good results could not be obtained without the aid of book-slates, honor-boards, star methods, convenient monitors and up-head and down-foot arrangements, because in a great many instances they have found that pupils have "studied harder" when they were urged on by "fear of disgrace" or desire for reward ; but there is one thing certain, that those teachers could tell, approximately, by some method like the one just framed, the general standing and progress of any pupil in their class, while they could save valuable time, which might be devoted to the interests of the children placed under their charge.

Accurate, definite and well-weighed estimates are not expected. The value of the pupil's recitations may be exactly given at the cost of eyesight or health in general. The mid-night oil may be used for the purpose of marking unsatisfactory pupils, who have in thousands of instances become stars in the professional or commercial firmament, while the time-squandering supposedly all-important, accurate records, made by zealous teachers or bribed monitors, remained as mute witnesses to show the many hours misused by the teachers who were marking, marking, marking,—or rather wasting, wasting, wasting those energies required rather for instruction and guidance.

In order to show that erroneous methods of marking exist, I will mention a few different ways which have been noticed, viz.: (*a*) Useless and frequent marking during recitation; (*b*) Monitors attempting to estimate the value of answers given, when they themselves are deficient and very often dishonest; (*c*) Teachers deducting marks for recitations on account of misconduct; (*d*) The teacher dividing attention between a text-book and a book-slate, while totally unmindful of the subject matter of the recitation or the one who is reciting. Such methods, which have robbed pupils of too many unreturning minutes, have evil consequences too well known by all active, progressive teachers for me to need to dwell upon them. Let it be sufficient to say that more injustice is done to the pupils by such marking, and more bitter hatred is aroused in the hearts of the future citizen than all the good qualities of the class teacher can counterbalance.

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rote methods of teaching; they have occasioned the most vicious habits of study; they have caused much of the over-pressure charged upon the schools, some of which is real; they have tempted both teachers and pupils to dishonesty; and last, but not least, they have permitted a mechanical method of school supervision.

"It is not asserted that these results, especially in the degree here indicated, have universally attended the adoption of the "examination system." These tendencies have been more or less effectively resisted by superintendents and teachers, and they have been measurably offset, in some instances, by other measures, as the considering of the recitation records of pupils; but the testimony of educators, competent to speak, confirms the writer's experience and observation, and inside facts show that the above indictment of the system when used for the purposes named is substantially true. In the very nature of things, the coming examinations with such consequences must largely determine the character of the prior teaching and study. Few teachers can resist such an influence, and, in spite of it, teach according to their better knowledge and judgment. They cannot feel free if they would. The coming ordeal fetters them more or less, whatever may be their resolutions, and many teachers submit to it without resistance; and this is sometimes true of teachers who have been especially trained in normal schools, and are conscious of the power to do much better work. They shut their eyes to the needs of the pupil and put their strength into what will 'count' in the examination."

Though I believe much of what Superintendent White charged against the examination system in Cincinnati to be true elsewhere as well, I should hesitate to recommend the abolition of examination for promotion for two reasons. In the first place, the objections to the examination system are valid, not against all examinations, but against examinations improperly conducted. When the examiner draws only from a limited stock of knowledge and consequently repeats his question over and over again, he puts a premium on cramming; when he asks for only unimportant details or insists that answers be given in the words of the book, he leads to the neglect of principles and encourages rote learning; but, when examinations are properly conducted, they are indispensible to the progress of a system of graded schools. Not only may they be made the means of preventing cramming and rote-learning, but of preventing a kind of teaching which I cannot help regarding as worse than either cramming or rote-learning, that kind which is so loose and desultory as to demoralize the intellectual habits of the students. The habit of mind we should aim to cultivate is that which in the affairs of life enables a man to see clearly the end to be accomplished, and to take with honesty and firmness of purpose the path that leads most directly and easily to its accomplishment. In every branch of study the cultivation of this habit is a thing to be kept ever in view. Every time the teacher wanders, or allows her pupils to wander, from the straight path that must be pursued to master a subject, she encourages the formation of habits, to which we are all too prone, that are the reverse of those to be desired. Now, it is only teachers of the highest order of whom in the nature of things there can be but few, that can, without external influence, curb this propensity to wander; and as examinations properly conducted, are the most powerful of these external influences, it follows that they should not, as yet, be abandoned.

But, even if the theory of dispensing with examinations for promotions were the true one, there is still a reason why it should not be universally adopted. This reason grows out of the statement already made in regard to the "inexperience" of some of the teachers. So long as many teachers are without professional training, so long as most teachers remain but one or two terms in a grade, it would be absurd to make their estimates or marks, even if revised by the principals, the sole basis on which to make promotions.

Neither, on the other hand, should examinations be the sole basis. A child may suffer so from nervousness at an examination that it cannot do itself justice. A principal may ask questions which the teacher has not fully covered during the term. In neither case should a child be compelled to remain a second term in a class, re-learning the same facts, reading matter that it already knows by heart, and going through exercises that can result only in mental nausea.

In the attempt to find a basis for a working plan, the first question that naturally arises is: "Of what shall a pupil's record of the term consist? Shall it be a record of recitations from day to day modified by deportment marks? To this plan, beside the objection already stated, there is one which is to my mind conclusive. It may be briefly summed up in the dictum; marking and teaching at the same time are incompatible. If a teacher gives her whole mind to the work in hand, she has no thought to spare for marking. If she subtracts from the sum total of her mental energy the amount needed to form a judgment during the lesson on the work of each individual pupil, the value of her teaching is diminished in proportion. The usual plan is to give up a certain amount of the time to the work of marking. For instance after a problem in arithmetic has been worked the teacher takes whatever time may be necessary to examine and mark the answer of each individual pupil. This is almost an utter waste of time, yet it appears to be a necessary concomitant of the system that requires the marking of each recitation made by each pupil. The plan results both in dissipation of energy and in waste of time.

Such a system, moroever, altogether ignores the different ways in which knowledge is acquired. These, as President Hyde, of Bowdoin College, has pointed out are three: First the apprehension of the lesson as stated in the book, or taught by the teacher; second, application, or power to put the knowledge into practice; and third, comprehension, or grasp of the subject in its important features and broad relations. Comprehension is best tested by an examination at the end of the term; though, of course, the examination need not be confined altogether to this purpose. Application can most naturally be tested through the class exercises in composition, in reading, in the solution of mathematical problems, and in drawing. Apprehension may be judged by the regular lessons on such subjects as history, geography, technical grammar, and the principles and rules of arithmetic. The school is evidently divided into three kinds of minds corresponding to these three ways of acquiring knowledge. In the race for promotion each kind is entitled to an equal chance. The plodder who learns every lesson and every detail correctly, but who is slow to grasp a subject as a whole, and has little or no originality; the quick, analytic mind that acquires empirical knowledge intuitively and applies it readily to the solution of particular problems, but is wanting in breadth and comprehensiveness; and the broad logical mind that grasps a subject as a whole and easily converts knowledge into faculty; all these different minds should have their special aptitudes considered and should be allowed to advance, so far as may be, with equal steps.

To devise a system of marking that would put on record at stated intervals the teachers' estimate of the pupils' progress in the apprehension and in the application of knowledge would not be a matter of great difficulty. Should the marks, after being scrutinized and revised at least once a month by the principal and his assistants, and averaged for the five months of the term, reach a certain standard, the pupil should be advanced to the next higher grade, even if he made a comparative failure at the final examination. On the other hand, even if the record for the term were poor, yet if the pupil passed an examination designed to test his comprehension of the various subjects as wholes, he should be advanced. Of course if both the record for the term and the record for examination were high there would be no doubt about the right for promotion. This plan, besides the advantages already noted, would have this also in its favor that it would make such subjects as drawing and observation lessons, which are now sometimes slighted by the teachers because they are not examined at the end of the term, count for promotion.

It is desirable to accomplish two things by promotion: First, to advance children as rapidly as is consistant with the healthy operation of their intellectual powers; and second, to secure as nearly as may be, uniformity of attainments among the pupils of a class.

be kept ever in view. Every time the teacher wanders, or allows her pupils to wander, from the straight path that must be pursued to master a subject, she encourages the formation of habits, to which we are all too prone, that are the reverse of those to be desired. Now, it is only teachers of the highest order of whom in the nature of things there can be but few, that can, without external influence, curb this propensity to wander; and as examinations properly conducted, are the most powerful of these external influences, it follows that they should not, as yet, be abandoned.

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Pupils' Note Books.

By CHARLES C. HOLDEN, Instructor, New York City.

IT is not deemed necessary at this time to attempt to point out the usefulness or need of a notebook for the student in the upper grades of the elementary school; for, that such a notebook is an invaluable aid to him and to his teacher in their daily work has long since been granted. Little need now be said more than to add a few suggestions as to the manner of best making the students' note-book serve its purpose. The writer believes that three things should be carefully considered by the teacher:

1. What subjects should be recorded in the pupils' note-book.
2. What arrangement of material should be observed.
3. What the records should include in order to be most helpful and not to become burdensome to the pupil.

Many subjects of the curriculum have sufficient matter and data in the text-books used without supplementary notes or aids; among such may be mentioned reading, history, geography, arithmetic. Much of the work in language, however, must be developed from materials connected with other subjects, or from materials furnished by the teachers' note-book. All such matter, together with the explanations and definitions pertaining thereto, must find permanent, systematic arrangement in the students' note-books. This record is needed for constant reference in the progress of the grade work, as it provides the tools which enable the young minds to discover new truth. The pupils must write the records neatly and clearly, and the teacher must provide an orderly arrangement.

And first, a carefully selected list of all words, connected with the grade work, that *are* misspelled by pupils, or are likely to be misspelled by some of them, must be recorded in the note-book. If false pronunciations of some words occur, the proper diacritical marks should be written with the words. Frequent reviews of these lists make them familiar to the pupil.

Next in importance come the new words whose meaning and use must be dwelt upon at some length. The etymological explanation of many such words assist the pupil far more in understanding their meaning and appropriateness than a mere dictionary definition, and enables him the better to discriminate the niceties of meanings in words that are somewhat synonymous. But great care is required to determine what to omit and what to include in definion and note. A good explanation or definition by a pupil is preferable, if it "covers the ground," as it excites his interest and inspires him with confidence. Who has not found that the surest way to engage and retain the child's attention and interest is to let him contribute as much as possible to the records he makes?

In studying technical grammar, whether of the word or of the sentence, we must have recorded in our students' note-books such matter and method as our text-books does not supply; such as, the order of the analysis of a sentence, and the tabular capitulation of the results of studying a part of speech, and the like, with rules for the inflections of words; for the punctuation of complex and compound sentences, etc. Much of the materials of grammar must be cullated and arranged to facilitate their orderly retention and ready application by the pupil in the work of composition.

The multiplicity of studies to-day renders it necessary to arrange in tabular view the topics in history, geography and science. Care must be taken, however, not to allow the outline study to precede the study of details, and the tracing of the relations of parts to the wholes, of which they are severally parts, and of their relations to one another. The tabular outline gives a bird's-eye view of a subject in much the same way as a diagrammatic arrangement of the analysis of a sentence shows, at a glance, the relations of the elements of the sentence to one another.

In advance of any record made by the pupil in his note-book, the teacher must know about how much space is to be allotted to each subject, and determine what order is most convenient or desirable; otherwise the note-book is likely to become confusing, and thus fail of its purpose.

The pages of the book should first be numbered. The index should show the pages between which each subject is contained. All records should be made in black ink, and should be written under the supervision of the teacher. This student's note-book, containing much valuable, useful information, orderly and logically arranged, becomes a permanent book of reference, whose contents will be both pleasurable and helpful to the student for many years after he leaves the class-room. Our pupils not infrequently come into possession of an older brother's note-book, and sometimes annoyingly anticipate the information we intended to give them.

The pupil must be led early to appreciate the value of his notes, and to regard the necessity for the greatest care in entering them in his book. The habit formed by the pupil in thus making and recording notes will be of more lasting benefit to him than the notes themselves.

The Relation Of The Principal To Class Instruction

By Burtis C. Magie, Principal, New York City.

IN the foregoing title the term relation is to be interpreted as supervision. Class-supervision is a division of the general science of school management. Class-supervision is, in turn, divisible, for purposes of analysis, into supervision of class organization, class-instruction, and class-government. The second of these only is to be considered here.

The following treatment is proposed: To make an analytical outline of the subject, the supervision of class-instruction, in the form of a table; to accompany the outline with such detail and comment only as will suffice to make clear the meaning of the conspectus, and give content to it.

Such a plan has advantages. It presents a systematic scheme of work, and it is fairly exhaustive. So far as we are aware there has been no treatise in books on school management setting forth the duties of a principal in respect to his supervision of class work. Consequently the attempt, however faulty, should prove valuable, aside from the merits or demerits of the plan proposed.

The analytical outline appears on the following page.

The supervision of class-instruction involves inspection and direction. The inspection should be systematic, and should be planned to correlate with the direction of the oral and written work, so as to make an harmonious scheme of supervision, as will appear.

The written work may be treated as being of two classes, that prepared by the teacher and that done by the pupil.

The plan-books, progress books, and class-records come under the former division. The plan-books vary in number according to the view which is held of their value and function. Some think there should be three kinds, that which outlines the work by days and weeks, that which details the subjects by weeks or other periods, and that which details the subjects as a sort of text-book of the grade.

Besides these there are progress books, or statements of work accomplished, to be kept. There are various opinions in regard to the number of progress books necessary, or at least in regard to the frequency with which they should be prepared. The object of the plan and progress books is to give content and detail to the subjects of the course of study and system to its execution. The simplest plan which will accomplish these ends and which will draw the energies of the instructor least away from his work of teaching is the best.

TABLE I.

School Management as Class Supervision Embracing.	Inspection of	Written Work.	Teacher's Books.	Plan. Progress. Record.		
			Class Work.	Pen gnd Pencil. Written Lessons.	Tested by	Progress. Neatness. Skill.
		Oral Work.	Teacher Tested by	Tact. Knowledge. Method, etc.		
			Class Tested by	Attention. Interest. Self-activity, etc.		
		Results by	Observation of	Skill. Expression.		
			Examination.	Oral. Written.		
	Directions by	Conferences Which are.	General. Grade. Individual.	Discussing.	Subjects. Methods. Devices.	
		Plans Formulating the.	General Outlines. Essentials. Steps.	Of the course of study.		
	Class Teaching Illustrating	Order in	Labor saving devices.			
		Discipline in	Self Control.			
		Studies.	Essential points. Methods. Devices.			
	Aim.	The Training of Faculty to the End of Instructive and Deductive Reasoning.				

Analytic Outline—Supervision of Class Instruction.

The following is an illustration of a daily and weekly plan-book arranged by subjects:

TABLE II.

	ARITHMETIC.	MUSIC.	SPELLING MEANING AND USE.	MANUAL TRAINING.	HISTORY.
Mon.	+, —, Denominate Nos. eview of 3 Problems. Dry measure.	Music book Page 25. Ex. 125.	Misc. 85-90. Reader 85-90.	Drawing of Square prism turned at 30° and 60°.	Queen Anne's War. Contemporaneous Wars.
Tues.	+, —, Denominate Nos. 4" Problem. Liquid measure	M. B. Page 26, Ex. 126 127.		German.	
Wed.	×, Denominate Nos. 4" Problem, Dry and Liquid measure	M. B. Page 26, Ex. 128 129-130.	Misc. 85-90. Reader 90-95.	Design for Candle-stick.	Queen Anne's War.
Thurs.	+, Denominate Nos. Percentage, Home-work correc'd	M. B. Page 26, Ex. 131 132.		Design for Candle-shade.	
Fri.	Bill in Book Review.	M. B. Page 26, Ex. 133	Misc. 95-100. Reader 95-100.		Queen Anne's War.

SCIENCE.	GEOGRAPHY.	READING.	GRAMMAR.	WRITTEN WORK.	ELOCUTION.
Nervous System.		"Hygiene" p. 149-158.			"The America Flag Lines— 24—28, "Lochinvar Lines— 1—4.
	Mexico, Extent, Surface, drainage.	"Our American Neighbors." p. 159.	Simple Sentences.	Penmanship.	28—32. 4— 8.
Nervous System.		Scudder's History in connection with History Lesson Class reader p. 62.			32—36. 8—12.
	Mexico, Products, Resources, Exports & Imports.	Tanglewood Tales, p. 110.	Simple Sentences.	Dictation, Quotation from Ruskin.	36—40. 12—16.
		German.		Composition, "A Letter."	Review.

The books containing the details and plan of the grade work in the various subjects, prepared by most teachers, need a word of comment. Probably the best way in which these books, sometimes called teachers' note-books, should be arranged, is to set forth in logical order the various facts or principles to be taught with sufficient detail to illustrate clearly what is meant. The phrase, "content of the grade," expresses the substance of what should be found in them. An arrangement which is based upon work done by weeks, or other periods, confuses, by bringing in more than one principle of classification, and is likely to duplicate unnecessarily part of the work of the daily and weekly plan-books.

The progress-book should be a sort of digest of these two, the note-book and the plan-book, and may be prepared as often as once a month. It may be arranged by subjects and months. To each subject should be allotted one or more pages, and the progress tered under the different subjects continuously every month.

These books offer an opportunity for the principal to guide as well as to inspect the work of the school systematically, with an eye both to the work of the grade and to that of the school as a whole. Suggestions written in the progress books enable him to indicate errors and suggest corrections in the most direct way and with the least expenditure of time and effort. The books themselves serve as a guide to the principal in inspection, not only of the ground covered in the various grades, but also in the inspection of the results of the work when he subsequently visits the class-rooms.

The following remarks are pertinent here:

The plan and progress books are desirable devices of school management, if well used; but they only give form to the work; they do not give substance to the teaching. The requirement that they may seem to demand of the teacher that he shall record with approximately equal exactness the details of his work in composition and in penmanship, in grammar and in spelling, in music and arithmetic, and be responsible for the grade advancement in each, is liable to lead to an undesirable consequence. There is connected with their use a possible tendency to make all school studies appear to be of equal value, and thus to weaken the sense of educational prospective in the instructor, so vital a characteristic of a good teacher, and to cause efforts at order and system to usurp the place of energy and originality.

A feeling that something of this sort is involved by their use sometimes creates among very conscientious and industrious teachers an emotion of distaste at the labor necessarily involved in preparing the books. The irritation is due rather to the vague sense of wrong than to a desire to avoid extra work. A clear understanding of their real use and purpose should change the sense of dislike into one of appreciation of their value as an educational instrument.

For this reason it should be remembered in planning a series of these books for a school that the work of teaching is of itself an arduous daily task, and that great care should be exercised lest labor not strictly necessary is exacted from teachers for the mere purpose of giving an appearance of finish and symmetry to the school management.

An attempt, moreover, to bring the pupils to a condition of uniform excellence in all of many subjects is a possible result of a wrong use of these plans. Children can put much effort on but few subjects daily. To demand of them a greater expenditure of energy than is natural, is a mistake, and prevents the accomplishment of the very purpose that inspired the demand. It is incompatible with real education. Surfeit in learning retards proper mental growth as surely as overfeeding does physical. On the other hand, the fact that system may be misused is no reason why the real usefulness of plan and progress books should not be made available.

The work of correlation is prepared in the plan books and supervised in the progress books. The correlation consists in planning the association of related subjects or topics so as to enlarge the child's comprehension of what he learns by bringing them to his notice together. The practical application of correlation so as to make it a time saving device by causing two lessons to be given at once is a matter that depends almost entirely on the teacher's skill.

A summary or digest of the progress books in a single volume has advantages, but is a work of much labor. When arranged in one book, and indexed by marginal cuttings, as dictionaries are, the compend is a volume that enables the principal to see at once the progress in any and every subject, to observe the advancement of the several classes, and to compare the condition of the school, from one term to another. where the books have been kept for a series of years. Where there is sufficient clerical assistance such a book is well worthy of the labor bestowed upon it. The calls upon the principal's time and energies are, in most schools and systems, already sufficiently exacting, and he should be cautious how he voluntarily adds additional tasks for himself.

The written work of the class consists of pen and pencil work, and of written lessons. A record of these exercises may be kept which will show the number of each required to be done monthly and the number that have been finished. Accompanying this record should be written the result of the inspection, setting forth the general character of the exercises as regards execution, improvement and progress, and such other criticisms as the nature of the case may warrant. These criticisms, or some of them, may be transferred to the progress books, and will form the basis for suggestive or illustrative work at subsequent times.

This record by months and classes will show at a glance the condition as regards the amount and improvement of the written work, both of the classes and of the school as a whole.

Where the digest already alluded to is in use the foregoing record, instead of being kept separately, might form part of it.

The inspection of the oral work requires somewhat different treatment, although it may also be considered in reference to that which relates to the teacher and that which relates to the class.

For the inspection of the work of the teacher the supervisor needs positive tests or guides. Many standards have been suggested by different authorities, so many, indeed, that-it is impossible to follow them all—their multiplicity tends to confusion.

A few should be selected as determinate standards. The following are suggested :

Has the teacher a full knowledge of the subject ?

Is there a definite lesson plan, definitely carried out ?

Are concrete illustrations properly used ?

The employment of a few principles as standards is likely to produce progress and improvement along the lines thus chosen. The standard of one term or year are not necessarily those of another. As certain ideals are attained by the majority of a school's staff, new ones may be selected; in time to be realized. Perhaps in no way could a system of development in *teaching* be better carried out than through a well digested and progressive plan of standards of criticism.

The suggestion of setting up a few standard tests, is not intended to imply that incidental criticism of defects should not be made. But it should not be too frequent.

The character of the teaching, as it relates to the claas is determined by other tests. As in the former case these tests should be standards, not too numerous, and progressive in their nature.

What shall the supevisor observe when looking at the class, so that he may determine, with some degree of exactness, the character of the teaching. One thing of prime importance is the attention which the pupils give to their instructor and to their lessons, and their interest in the work.

Where there is nothing left to be desired in regard to attention, where the interest is strong continuously, it is difficult to conceive of the teaching as being otherwise than excellent. It is equally difficult to conceive of the teaching as being very meritorious, where the attention or the interest is weak or vacilating.

Are the children busy is another important fact to be determined by the inspection. The essential character of this test scarcely needs emphasis.

Do the children take pleasure in their work. Herbert Spencer lays this down as a fundamental principle. It certainly merits attention as such.

There have been enumerated six, or if interest be considered a separate one, seven, tangible points of class-work which may be tested, and compared to a practically fixed standard during visits of inspection.

Other matters that might be mentioned, as the character of the questioning, the voice and manner of the teacher, the quiet, order, manner and tidiness of the children, may or may not be equally fundamental with those already suggested, but they may very well form part of a subsequent course of development.

The point intended here to be emphasized is that a systematic plan of inspection, carried out in all the different lines of school work is most likely to produce a harmonious progress in the teaching force of a school—whether that plan be outlined in this article, or that formulated elsewhere.

While it is important that a teacher should not be confused by too many suggestions, it is equally important that necessary criticisms should be given. What they are will depend upon the plan of development which the principal has marked out for the school. The originality, the individuality, the self-respect, and the freedom of the instructor should be carefully and constantly respected. Too much force cannot easily be given to this statement. An excellent teacher is an artist, a person whose work is a profession, and all restrictions that do not recognize this are wrong, and tend to make him a mechanic and a formalist.

Besides observation as to the manner in which the work is carried on, it is also necessary that attention should be paid to the results of it.

In general, the results may be summarized under one of the following terms—skill, expression, originality. Skill designates the ability of the child to perform readily and easily the work which he has practiced. Expression signifies that he can discuss with intelligence and clearness, whether by word or pencil, the subjects with which he has to do. Originality denotes his power to pass on to connected concepts through his own discoveries and reflection; to use his imagination and reason in regard to the relations which he observes. In a class under guidance of a high order of merit, all these qualities should be manifested in large degree.

Besides the mere observation of results, something in the way of examination should be done.

Casual and incidental questioning will oft-times make the best kind of examination. When the question is so made as to bring out an essential principle of the subject, it serves not only to test the information acquired, but also as a stimulus and drill. Questions which, in order to be answered, require of the pupil an observation of objects of thought, a discovery of relations, and an expression of judgment concerning them; an application of his powers to untried matters, serve this purpose.

Definite oral and written examinations also have a place in school work. Like all other school instrumentalities, examinations may be misused; but when used properly they are very far from being valueless. One end which they may be made to conserve is that of giving content and unity to the grade work. A well-prepared set of examination questions in a single subject for all grades of a school prepared with the foregoing purpose in view, ought to assist greatly in unifying, harmonizing the work of the grades, and should also emphasize the essentials of each grade. So constructed they will prove a valuable auxiliary to the teachers' plan books, upon which they might be, in part, based. The examinations, or tests, also serve to stimulate an interest in, for their lessons in the children. The main feature of evil in examinations consists in making the answering of questions, especially questions of fact, (which should rarely, if ever, be asked,) an end for which pupil and teacher alike strive, and thus stimulating the tendency to seek for verbal and formal information instead of real knowledge and growth. This tendency can be obviated by having examinations at irregular and infrequent periods, upon different subjects and at times when they will not affect the standard of promotion, and by putting them in such form that they test, as already emphasized, not the memory, but the capacity to apply power in a new direction.

The inspection of classes and teachers thus far has been regarded as a method of determining that the requirements of the law have been complied with, of the efficiency of the teachers, of the propriety of the manner in which it has been done, and of the success of the work. But, besides this, it is important to observe how the details of the course of study are being actually carried out. One plan of doing this is by a series of consecutive visits to the classes in the successive grades, and during such visits observing the work in a single subject. Whatever be the topic chosen as, history, notes taken may be made the basis of suggestions or changes that form the object of all supervision; unity of plan and continuity of effort.

A second general feature of the principal's supervision is instruction. He may impart instruction to teachers by conferences, by topics, by suggestions and by plans.

The general conference is the place in which suggestions relating (so far as class-instruction is concerned) to all grades are to be considered. General principles and theories may be discussed and general errors pointed out. The grade conferences, in which the teachers of one or more grades are called together, gives opportunity for treatment of particular studies and devices. Individual conferences should generally be the result of work done in the class-room. Where observation of work has been made, and notes taken in the principal's notebook, a common ground is had for subsequent discussion of points in the lesson. In the case of young teachers and unsuccessful teachers great benefit can be derived from individual conferences of this kind. *Care, however, needs to be taken* *to avoid arousing the feeling on the part of the teacher that the principal's note-book is a record of the ill deeds done in the class.*

Every means should be used to lessen the nervous strain on the instructor that any adverse criticism may awaken.

The principal's direction of the school work through the plan and progress books has already been indicated in treating of them. It remains to be said in general terms that his supervision consists in unifying the plans; first, by suggesting, emphasizing, or illustrating, as circumstances may render necessary, the fundamental concepts of the course of study; and, secondly, by modifying or arranging the details so as to harmonize the work of the grades with one another.

In some instances the plans would better be made by the principal; as, for instance, a course of selection and memory gems, and a course of supplementary reading, as reading; not the correlated selections gathered by the teacher to enlarge the associations of the concept in geography, history, or other subjects.

In most subjects there is likely to be more life, interest, and originality, in the teaching if the plans are in the main the instructor's own work.

Often instruction given to young teachers is not very effective, because they do not know how to apply it. For this reason class-teaching by the principal is valuable. A novice may sometimes receive valuable help by maintaining order, observing a lesson given to her class, exhibiting labor-saving devices, showing how the class may be managed in the way of distributing materials of work, such as pens, paper, books, and the like. Suggestions as to the best means of management may be made in these lessons, as it were by accident, and oftentimes they will be better understood than if they were the subject of direct instruction to the teacher herself.

A course of lessons on that subject of study which seems to present the most difficulty to the beginner may also be given with advantage.

The object in such lessons may be to instruct the teacher in the subject matter of the lesson, in methods of management, or in some especial device. In such cases, or in those mentioned below, calling attention to the real purpose of the lesson may make it more effective. Sometimes an illustration of how to secure interest, and consequent attention, may be shown; sometimes the formal lesson-steps, sometimes methods of keeping children busy; sometimes the value of a thorough familarity of the subject from a teacher's standpoint.

In all this work of the principal there is to be kept in view the general aim that gives individuality to the school, and which should result from the peculiar supervision which it has.

Necessarily, there should be the purpose of preserving an order that ensures quiet, punctuality and promptness, and a discipline which is to be founded in self-control. But besides these, it would seem that the great effort in the supervision of the class instruction should be to bring about that kind of teaching which produces mental power.

For many years past there has been a continuous progress in the school work of this city, a progress upwards and forwards. In twenty-five years there have been many changes in ways and means and plans, and the residuum of all has been gain and improvement. Object teaching has begun to be objective work, reading has begun to be literature, arithmetic, reasoning, geography, and history, science and drawing, art. But we are still at an early stage of progress. The way is long and the steps are many before we shall reach the goal. But the goal is what we must keep in sight, and that school will be the best managed, that system the best conducted, which, besides the careful supervision of detail, and the systematic supervision of the teacher's work, has infiltrated in all its operations regarding intellectual progress the purpose of beginning its training in the senses and ending them by the cultivation of inductive and deductive reasoning.

Instruction In Its Relation To Education.

By G. J. Smith, Member Board of Examiners, New York City.

I TRUST it may not be deemed unwarranted if, in writing a concluding paper to a monograph on class-instruction, I devote much of my space to that portion or phase of the class-teacher's work which is not instruction. In this symposium the subject of instruction is variously and ably treated, as befits its importance. But for that very reason it would seem well, if there is to the teacher's work another side having weight and claims to consideration, that that side should not go unrecognized in this group of essays.

Let me say at the outset that I would on no account seem to underrate the great place which a sound and ample instruction—the securing of a wealth of knowledge—must always have in the work of education. In fact I shall try to show some of the grounds upon which must be defended the giving of the larger proportion of the teacher's time and effort to the work of instruction. That work alone is varied and difficult, and demands of the teacher much in the way of skill and equipment. Furthermore, the other phase of the process of education has close relation to the work of instruction, being either accomplished through the instruction and along with it, or built upon the instruction as a house upon its foundation.

In order to get the bearings of the several parts of the great labor of education let us, without further preface, ask, what is the teacher's work? It includes, broadly speaking, two main lines of effort: Instruction and Development or Training. (We may regard what is included in class-management as pertaining to the necessary means or conditions for the real work of the teacher).

Let us briefly distinguish these phases of educational effort. Instruction has to do with the acquisition of knowledge by the pupil. "The characteristic feature of instruction," says Professor Rein, "lies in the fact that teacher and pupil are engaged in common upon a third object." In other words, instruction implies distinctly teacher, pupil, and subject matter. Good instruction implies proper conditions, a knowledge of them, and a skillful procedure. Instruction is not a pouring-in. It is not an iteration. It cannot be compassed by any amount of activity, dexterity or sonority on the teacher's part alone. It deals with and results in an intellectual process, that of learning, and this must go on in the pupil's mind. The teacher must understand this process, and act accordingly. For, as Goethe says, "The human mind receives nothing which does not suit it." In this fact lies the supreme importance of the doctrine of apperception, the gospel of instruction. The mind must be gradually informed or prepared for the new knowledge it is to receive. The very word instruction (*in*, *struo*) means a building into, and implies a foundation. All this and more has herein been elaborated and brought home by others. My purpose is in these few sentences briefly to re-state the meaning and the nature of the work of instruction.

Now what is included in the other great realm of the teacher's activity, (development or training), and what is its relation to the work of instruction? The first observation to be made is obviously that while instruction has to do only with an intellectual process, development or training has a wider application. It has to do not only with the intellects of the pupils, but with their bodies, and, most important of all, with their emotional and their volitional functions. I hope to be able to make good those words, "most important of all;" but first let us consider more specifically, what is there in man that awaits development or training? What are the essential elements in a complete unfolding of a human being? I think the following heads may be accepted without present argument, as offering an accurate enough answer:

1. The physical powers and the physical susceptibilities are to be developed into health, symmetry, strength, skill, and delicacy.
2. The intellectual powers are to be trained (and as a natural consequence, delight in the exercise of them including the faculties of observation, apprehension, memory, imagination, judgment, reasoning and expression.
3. The aesthetic and the moral susceptibilities are to be developed and cultivated so far as possible, through right habits and desires.

To these might be added a fourth line of development, for from the above unfoldings, and from sound and ample instruction, should result a training in the art of living, whereby life may attain the maximum of usefulness together with the greatest possible and the finest possible range of enjoyments. The last sort of training, however, we need not now consider at any length, because, as the flowering of a true education, it may be trusted to follow from faithful and wise attention to the plant itself, nor can it otherwise be attained.

As for the first, physical culture, there seems to-day small need for urging its fundamental importance. Still, though a complete and cheerful assent is given on this point, proper or even fairly good facilities for physical training are only occasionally provided. This is one of the particulars in which educational practice drags far behind orthodox precept. The possibilities of reasonable and necessary improvement in this direction are very appealing. We need more generous gymnasiums, more provision for out-door exercise (as on roofs or on playgrounds), we ought not to demand in vain that children be placed in buildings whose ventilation and whose sanitary conditions are the best to be had. And not only should school life be conducive to bodily health, but it should provide for the definite training of the eye and of the hand. For, after all is said, we learn of the world about us through our bodily senses, and we act upon that world mainly through our bodily organs, in subjection to the mind. Hence, as mind and body are inseparable, keen and discriminating sense-activity and skill in the use of muscles are invaluable, not only from the practical, but from the intellectual, the educational, point of view.

Secondly, I have in the above enumeration briefly indicated the main heads of what is included in intellectual training, which, though often inadequately accomplished, is doubtless the least neglected of the three directions in which the pupil's nature should be developed. It is, perhaps, hardly worth while to inquire whether the training and strengthening of the intellectual powers is not more important than the imparting of knowledge. On the face of the question, it looks as if to observe accurately, to image vividly, to concentrate, to judge, to reason, to express oneself well, were of much more consequence than to leave school possessed of a quantity of facts and a number of more or less general maxims or conclusions. For the trained mind can acquire facts independently, can digest them and make use of them. So it would appear that the teacher would do better to train the intellectual powers than to place the emphasis upon the work of instruction. But in point of fact, as every teacher knows, intellectual training and instruction go, to some extent, hand in hand. Instruction could not be accomplished at all, without at least incidental intellectual training; and there has been in the mind of every competent teacher a distinct recognition of such training as an important end in school work, so that it has been achieved in some degree not only incidentally but purposefully. Still, I think the great importance of training the powers of accurate observation, of concentrated attention, of comparison, of reason, and of adequate expression, is not generally recognized with proper distinctness and emphasis as an end in education. While it is true that these powers of the mind are to be developed in connection with work of instruction, and through the exercise of the mind upon the subjects of instruction, yet if the teacher is thinking mainly of the mere acquisition of knowledge by the pupils, the work of instruction may be carried on in a manner that develops the mental powers, except memory, only in an unduly slight degree. I think the facts bear out this statement. On the other hand, if the teacher consciously, constantly, and emphatically aims at mental training as well as a imparting knowledge, not only will the work of instruction be better done, but the at least equally important work of developing the mental powers of the pupils will not suffer from neglect.

To admit that parts or phases of the complete education are mutually related so that to some extent they go on together does not mean that a particular system or mode of education may not be one-sided or partial in its results. It is true that just as instruction and intellectual training aid each other and imply each other, so it is impossible to educate the mind as a whole to any lasting advantage unless the body be reasonably well cared for, and allowed in some degree to develop in beauty and capability. Likewise, though less obviously, the free and true developments of the aesthetic and the moral nature have intimate relations with bodily health and comeliness and with the full blossoming of the intellectual powers. All the phases or elements in education work together, in short, all are reciprocally helpful, they can no more be properly separated and independently pursued than the faculties of the mind itself or the health of the several parts of the body itself may be. Man is a living unit, and he must develop as an organic whole. But it is requisite to give all the elements of his nature due and intelligent attention. If we forget or neglect some portions of a full-orbed education, the danger is not that these portions will be absolutely unbegun, but that they will be comparatively slighted, and the resulting man unsymmetrical, lop-sided, and, in fact, not full-grown even on the better-developed side. Hence, instruction should be accomplished not only with the aim of imparting knowledge but with due regard to the bodily health and growth of the learner, and with constant and prominent attention to the strengthening of his intellectual faculties.

We have, so far, in a general way, distinguished between instruction and training as parts of the teacher's work, and considered, rather slightly, two of the three modes or directions of training. It is for us now to take up the remaining sort of training, that of the aesthetic and of the moral nature, ascertain the value of it, its relation to the rest of the work of education, and touch upon the practical means of attaining it.

At the outset here we should note a rough but natural distinction. Physical and intellectual training may be taken together, not only as having a special mutual relationship, health and strength of body being aidful to intellectual power, and vice versa (mens sana in corpore sano is no arbitrary combination), but these two kinds of training are, in their most important aspects, both a training of *powers;* while the third sort of training we are about to consider is a training of the directing or guiding function, by which is determined the uses to which the bodily and the intellectual powers are to be put. It needs no argument to show that, within limits more or less sternly fixed by nature, or as we say heredity, for each individual, these powers may be developed and trained; and the means of strengthening them and making them efficient, within their potential capacity, is well known to be the wise direction of the exercise of them. Whether and how the guiding principle in man may be trained we shall soon consider; let us first be convinced of the importance of such training.

Now, indispensable as are physique and intellect, I think it will not be very difficult to show that bodily strength and efficiency or intellectual training and instruction combined are not the true or highest goal and satisfaction of the enlightened teacher.

Evidently we must first ascertain here what is the paramount end and purpose of the process called education. And since education must be in the largest sense a preparation for life, we must ask, What is life for? What is the supreme goal of human effort on this earth? It is, improvement in and among men. This is what is meant by progress: Improvement in men; that is, the greatening of their powers and the better directing of their actions; improvement among men, that is in their relations, that they may increasingly cooperate for the good of all, which is the good of each. These two lines of improvement are one; they go on concurrently and interactingly. The paramount aim in human life is this progress, this movement toward the perfecting of men as persons and of society as a living assemblage of persons; a progress which carries with it an increase in human well-being, an increased richness and abundance of life, and which would otherwise not be desirable; but which, nevertheless, is to be attained, not by aiming at this well-being or happiness, but by aiming at the source of it, namely the perfecting of men and of their social relations. For the sake of this supremely to be desired progress, the complete aim of education is to make men of power and men of right inclination in the use of their powers.

Now, the increased development of human powers, both physical and intellectual, is clearly of vast importance to the cause of progress; for these powers are the active, the achieving, force in life. But it is conceivable, and it is, indeed. a matter of common observation, that a man may calamitously misuse his powers, however greatly these may be developed. And in such cases the greater the man's powers the more harm he may do to the cause of progress. Therefore, we must agree that physical perfection or intellect itself is not the crown of life, not the end of education. For the important, the ultimate, thing is not so much what men know or can do, as what they do—how they live, with what purposes and relations to others, and to society as a whole. To be sure, what men know has much to do with their conduct of life. This I shall try to make clear before long. But the supreme test of a scheme of education is, what sort of a life does it prepare for and result in? With a view, then, to the highest earthly goal of human effort, we must declare the paramount aim in education to be not so much the development of the bodily and the mental powers as the development of right inclination in the use of those powers, or, as we may say, right taste in matters of conduct. But, of course, the question occurs, What is meant by "right" inclination or "right" use of our powers? By the word "right" I mean precisely that which is consistent with and aidful to the personal and social progress already defined. Whatever conduces to true progress or aids in it is right.

Doubtless, in using the word "inclination" I have assumed that our actions are determined by our inclinations or desires. This assumption I must justify, for, of course, what is of immediate importance to human progress is the right sort of actions, of conduct, which, in Matthew Arnold's phrase, is "three-fourths of life." We must consider, then, the very important question how actions may be, more or less, determined; and in order to do this we must understand the causes of actions.

Actions are instinctive, habitual, or consciously willed. Instinctive actions are those which are due to racial or hereditary tendencies. Examples of instinct are the combative instinct, the instinct of pleasure in the beautiful. Even instinctive actions are not wholly beyond the reach of education, for by controlling the frequency of such actions through multiplying or through removing the stimuli that call them forth, we may within considerable limits develop or atrophy the instinct; we may, in other words, feed a tendency or starve it.

Habitual actions result from repetition of actions which may have been either accidental and unintended (as the crossing of the legs when one is sitting), or originally performed intentionally (as the act of smoking). In time actions of this class become automatic, or almost so, requiring no conscious attention. Habitual actions are determinable by education, in a large degree, through the suggestion or the requiring of the acts intended to be made habitual. On the other hand, a habit not deemed desirable may be discouraged, weakened, or eventually destroyed, by the opposite method—that is, by avoiding the suggestion and the occasion of the objectionable acts, and by cultivating a tendency to opposite sorts of acts.

As for acts consciously willed, these spring from desires. What, then, is the genesis or explanation of desires? This is a hard question, for though desires are highly conscious states, yet they are rooted in instinct and in habit and in the whole complex of the sub-conscious life of the soul. In fact, about all the explanation of desires that is possible is found in the fact that they, like all mental states, are a product of two factors: the self and the external stimuli. For, to call forth a conscious or positive desire, some external stimulus or occasion is requisite. This may be an actual object or group of objects, or it may be a mental picture. With adults it is usually and predominantly the latter. That is, we desire what arouses in our imaginations agreeable pictures. Thus, for example, a man may desire honors or riches because of his imagination of attractive scenes and situations in which he figures, and which he thinks of as the result of his having riches or honors.

But the same external objects or the same mental pictures may arouse in one man a desire, in another a repulsion, or in a third it may produce neither. It has passed into a proverb that there is no disputing about tastes. This obviously implies that how a man is affected by a stimulus depends upon the kind of man he is, upon his character. But as a man's character is but the stamp or mould, or rather the organization, given to his inherited nature by the experiences of the man, we are led to the conclusion that character, being largely the product of repetitions, is trainable or producible through a more or less perfect control of these experiences.

In short, we find that all actions, whether instinctive, habitual or willed, are ultimately determined by the original or inherited potentialities and tendencies of the soul, and by the stimuli, the experiences, which fall to it after birth. Since the former is wholly beyond the reach of education we need simply to recognize it as the inexorable limit to the power of education. But through the selection and control of a child's experiences we may influence the degree to which instinctive tendencies are strengthened, or, on the contrary, abrogated; we may influence, positively and negatively, the development of habits leading to more or less automatic actions; and we may influence the child's future conscious desires in two ways—that is (a) through enlarging the range of stimuli and enriching the mind with reliable conclusions about them; and (b), through the formation of habits of reaction upon these stimuli, or, of character.

What this amounts to is, that the parent and the teacher may enter into the control of the future man's desires by two doors: instruction, and training. Now, as progress demands a certain kind of action, and as willed actions come from desires, and as both instruction and training have a share in the determining of desires, we are brought face to face with the question of the relation of instruction and of character training to progress.

What is the real value to a man of his having much information? Are facts in and for themselves a valuable end? Obviously not. The use of knowledge must be sought in its relation to action and so to human progress. Knowledge has, as we know, a money value, and it has a value of repute, of respect among men. But these are not fundamental considerations. Men should be widely informed, should be rich in organized knowledge, in order that they may act wisely. For the well-informed man is more apt than the ignorant man to desire intelligently and rightly, because his information gives him a comparative wealth of mental pictures and a supply of tested truths and principles. He sees more of an imagined situation than does the uninformed man; he sees more sides of a situation; he knows better what the thing which would appeal to his desire involves and contains and carries with it. Suppose, for example, a man who desires to be prominent among men, a person of influence. Why does he have the desire? Because, as has been pointed out, his imagination conjures up, if he is a man of ordinary type, agreeable pictures in which he figures—he sees himself important, honored of men, seated in a position of power; or, perhaps, if a man of finer character, he thinks of himself as rejoicing in opportunities to do good, to be of great service to his fellowmen—he may be the kind of a man to whom such a thought would be sweetest of all. He sees through the popular fallacy of greatness into the secret of true greatness. Now, it is easy to conceive a man relatively ignorant, to whom the notion of being in high position would present only the most agreeable pictures. But a man who knew much about the obligations of greatness would picture much, both of agreeable and of disagreeable, that would never enter the mind of the uninstructed man. Hence the latter is less able to weigh the pros and cons of a situation upon which his imagination plays, and he is far more prone to desire ignorantly, and therefore to act unwisely. Nay, more; he is apter to act from wrong and low motives. For though an ignorant man may of course be a good man, that is a well-intentioned man from the social point of view, he is, as a rule, far less fortified against appeals to his lower impulses and his less social tendencies, for the simple reason that he sees less of whatever presents itself to his mind, and that he has fewer tested conclusions as to the nature and the method of the world we live in. Thus most indulgence of wrong desires (*i. e.*, desires resulting in actions opposed to progress, to human betterment) springs from ignorance. Selfishness itself is largely due to ignorance, to narrowness of view, poverty of imagination. Hence the real importance of true and ample instruction.

But instruction alone, much knowledge alone, is, as we have seen, plainly not enough to secure right inclinations or desires. For since instruction affects desires only through the imagination, and through the reason working upon the mind's fund of conclusions or generalizations, and since the same image or picture may be, as I have said, attractive to one man and insipid or even abominable to another, the fundamental problem after all is the formation of character, of the right stamp in men; the production of men whose taste imperatively demands the good and the beautiful, because this appeals to living susceptibilities in them; of men who so react habitually or willingly upon stimuli, whether concrete or imagined, that their resulting desires and actions are good, that is, aidful to human well-being and progress.

To what extent and how can this end be compassed by education? The problem is to make men who, in the myriad situations of life that demand a choice in conduct, will, whether from habit or after deliberate consideration, desire and act "rightly." Doubtless the man who does right from habit, or to whom the choosing of the right is not a matter to waste time over, is the highest product of true education. But the man who does right after deliberation is on the main highway to becoming a man who does right as a matter of course. The question is then one of developing right habits of reaction, which will in time become more or less "second nature." For in proportion as a man's energies are economized more and more through the formation of habits, the more energy will remain for the formation of new and still higher conscious desires, and for carrying them into action.

Now, the way to create a habit is by exercise or repetition. The sort of habit here in question is not a habit of action, however, but a habit of reaction, a habitual way of being impressed or appealed to. A habit of this sort may be termed a susceptibility. A susceptibility to moral or social considerations may, like a susceptibility to the aesthetic, be cultivated only through repeated appeals to it. It must be granted, and it may be granted without risk of error, that in every soul exists a greater or less capacity for ethical and aesthetic emotion, a more or less developed susceptibility to ethical and aesthetic stimuli. Growth of susceptibility comes from exercise, repetition. Therefore to develop a taste for the beautiful, surround the growing child with the beautiful, let the appeal of the beautiful be made again and again. So with the appeal of the good, the morally beautiful. Let the child perceive beauty in the demeanor and the conduct of his teachers, let him learn of moral greatness through literature, song, story, history, biography. A soul's susceptibility is a delicate flower. It cannot be made to grow by digging up its earth or by focusing upon it with a sun-glass excess of heat. It must be induced to grow, not forced. It must have opportunity and natural conditions ; its embracing atmosphere must be congenial and encouraging, but not artificially surcharged with any element of stimulation.

The susceptibility to the charm of the good and the beautiful is not an unnatural or exotic growth. Nature co-operates with the teacher to produce it, for nature has provided that the aesthetic and the moral joys or elations are as real as any others. And not only that; man experiences the most abundant and satisfying life only upon the condition of his being susceptible to the ethical and the aesthetic sources of delight. These, he learns, outrank the physical and the merely intellectual enjoyments. Thus does nature herself work, by the rich rewarding of the preference for the beautiful and the good, to encourage the ages-long struggle of man for progress.

I may as well pause here a moment to note why I have always grouped together the aesthetic and the moral or ethical. That there is a distinction, everybody knows ; but it is not important in the present inquiry, since, for whatever reason or in whatever obscure way, not now to be inquired into, the delight in the beautiful, whether in nature, life, or art, is closely united with the delight in the good, and both make for the elevation, the ennobling, the growth in righteousness, of the human spirit. To surround the young with with the beautiful in nature and in art, therefore, to bring repeatedly into their minds all that is pure and lovely and of good report in literature and in life, infallibly tends to their moral uplifting. The appeal, then, of the aesthetically beautiful is one of the greatest means of moral culture ; and if, as I have pointed out, moral education is the highest and the most vital work that may be done by the teacher (than whose work none is higher or more beyond valuation), then the training of the aesthetic susceptibilities is to be ranked as among the most important and requisite elements of education.

A word, too, here, about the inevitable connection of sound moral training with intellectual and physical training. As it has been well put, one of the best ways to make a boy good is to make him good for something. Let him through instruction develop a many-sided interest in the world about him ; and let him learn to vent his activities, not only in study, but in useful and creative construction, in which, of necessity, both mind and body play a part. To be able to do something worth while with the hands has been the salvation of many a man—not the source of physical development or of intellectual growth merely, but the basis of moral upbuilding into a life of sobriety and diligent usefulness. The man who is "good for nothing" in this working world of men is not merely a cipher, he is nearly always a dead weight on the wrong end of the scale, a man whose vices deduct so much from the profit and loss account of man's long effort for progress.

I have tried to show in this paper how the labor of instruction and that of training are related, and for what high end they work together. I know that too much is frequently demanded from the teacher and the school ; I know that the real education of a boy is largely contributed by the street and the home. For long years to come teachers must labor under great disadvantages in any event ; that the labor will be faithfully and generously given is much, but it should also be intelligent and broad of aim. Into all the work of instruction the idea of training may and should enter, and each will help the other. Rightly maintained, the work of the schools will be the work of world-bearing Atlas. Admitting that the teacher must labor against great odds, let us not cease to magnify his office. For the teacher is the professional promoter of progress, the most effective laborer for man's highest earthly aim. In the making of wise and competent teachers man finds the fulcrum of the lever that will lift his world. By breadth and thoroughness of instruction and of intellectual training, but still more vitally, as I have tried to show, by developing and strengthening and imbedding in character the susceptibility to the good and the beautiful in work and life, the teacher will do his great share in producing men whose desires are the parents of noble actions. Only through the making of great souls, dwelling in bodies fit to be their temples, souls not only intellectually strong and well-equipped, but aesthetically and morally sensitive, and habituated to the love of the fine and the true, does the teacher rise to the height of his great calling. Who has a better right than the teacher to claim to stand in the vanguard of the great forward march of man? As the "good gray poet" puts it:*

" And you, America,
Cast you the real reckoning for your present,
The lights and shadows of your future, good or evil?
To girlhood, boyhood look, the teacher and the school."

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* Walt Whitman's Leaves of Grass, " An Old Man's Thought of School."

New York Teachers' Monographs.

. . . CLASS INSTRUCTION . . .

MARCH, 1901

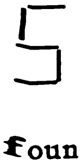
The Evolution of Applied Arithmetic.

By David Eugene Smith, Principal of the State Normal School, Brockport, N. Y.

OBJECT OF THE PAPER: Why should we know or care anything about the evolution of applied arithmetic? How can we use such knowledge? Are we better teachers for having it, or is it merely one of the "frills" at which the newspapers scoff and which the doctrinaires applaud? Is this *Monograph* the better for recognizing the value of this subject, or should the editors be criticized for admitting a paper dealing with it? In fine, is it "academic," as we hear people say, or is it practical?

Although there are worse things for teachers than discussions that seek the ideal, and although it is not so bad to be "academic" at times, nevertheless it may relieve some doubting reader if it is said at the outset that the paper is intended to be practical, and its teachings to be usable by the teacher in the upper grades. Indeed, it may be said of this as of every other subject in the curriculum that the teacher who has no idea of how it has come into being will have no idea of its future and will tend to stagnate.

2. How Such Knowledge is Usable. Is not a teacher of primary arithmetic (or "number," if you please) a better teacher for knowing something of the evolution of our system of numerals and of the Roman system? She certainly is not so liable to perpetuate the absurd notions, still found in the schoolrooms, that the figure 5 originated by laying down five sticks of equal length, neither will she say that the Romans were in the habit of writing 1900 MCM.



The same reason for looking into the evolution of the science is found at every step of the course. Think of the discussions carried on by teachers as to the two common laws of subtraction, say in 41—29, the borrowing one from the tens of the minuend or the adding one to the tens of the subtrahend! They attack the problem as if they were working in a virgin field, unaware of the fact that the discussion has been carried on since arithmetics first were printed, and that the case has long since been settled, and that, as a matter of fact, neither plan is as practical as the comparatively recent "Austrian method," as it is called.*

And as to "applied arithmetic," if we may thus designate what is often so little applicable to the real work of life, this matter of evolution is equally important to the teacher. It is only a dozen years ago that a prominent educator in New York State took me roundly to task for advocating before a body of teachers the use of the time devoted to troy and apothecary's measures for teaching the metric system; yet to-day this system is used in every laboratory in the land, and one must know its leading units in order even to read the daily foreign news with intelligence. Another man, still prominent in teachers' gatherings, remonstrated with me at that time for advocating the elimination of duodecimals from the course, entirely unaware of how they got into the arithmetic, where they once had value; how that value had disappeared save in one small detail of a technical nature; and how, in consequence, the subject was bound to "go by the board," as it has gone. Only a few years since still another prominent teacher, one of the best known in a neighboring state, attacked me before a large body of teachers because I was iconoclastic enough to assert that alligation had no place in arithmetic. And yet a glance at the evolution of this subject, a cumbersome device for solving an indeterminate equation, would have shown any one that the time had come for relegating it to the museum.

These incidents are mentioned, not with any desire to speak of personal matters, but to show how, even to-day or only yesterday, the applied part of arithmetic is or was in evolution. Nor must it be thought that because duodecimals have been laid aside, and alligation has gone, and the metric system is now taught (after a fashion) in all our schools, that the teacher's part in the evolution of the subject has been played. It is just because it has not been; it is just because the New York teachers have an enormous influence in setting the pace for the country; it is just because they can, if they feel the necessity, continue to improve the curriculum and the examination questions set in the city and State, that this appeal is made to them to view the subject as in process of development.

3. THE TABLES OF DENOMINATE NUMBERS. When arithmetics were first printed, Europe was more or less divided into small

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* This plan is briefly suggested in Beman and Smith's Higher Arithmetic. Boston Ginn & Co.

principalities. Each of these, and certain of the cities as well, had its own system of measures. Decimal fractions were unknown and the advantages of a uniform scale of ten had not been discovered. In consequence of these two facts the tables were numerous and were on a varying scale. A certain German arithmetic of 1619, lying before me as I write, has twenty-three pages of denominate numbers, chiefly pertaining to German or Swiss cities. There are, for example, the Cologne monetary table, and those of Frankfort, Lübeck and Nürnburg. There are our familiar apothecary's weight, the corn measure of Bern, a comparative table of yard lengths of different cities, and a table of time according to the Julian calendar.

A copy of Cocker's "Arithmetick," the most celebrated work of its kind appearing in England in the 17th and 18th centuries, and which is the corner stone upon which our American arithmetics have built, is also before me. Here, in addition to most of the tables that we find in the books of to-day, are tables involving the dove, todd, weg, last, pottle, comb, ell, and numerous other measures now entirely unknown, in this country at least.

What is the lesson in all this? That the tables of denominate numbers are constantly in process of evolution. What business demanded a century ago, even a decade ago, may not be demanded at all to-day. It is the teacher's business to look out for these changes.

For example, why should we spend much time on apothecary's measure to-day? They are still taught all through the cities and country. But they are of almost no value as general information; they are part of a trade, just as are the Latin names of the drugs. The teacher is entirely justified in spending the time on other parts of the subject, save only as the demands of some examiner, wedded to ancient ideas, may need to be satisfied. The same is true of troy weight, part of the technical education of a jeweler's apprentice and having no more place in common school education than the cleaning of a clock. But the metric system, which made such phenomenal progress in the world in the closing decades of the nineteenth century,—this may well deserve the enthusiastic attention of the teacher. The general information of a citizen of to-day requires some knowledge of it.

4. PARTNERSHIP is another topic of arithmetic that has undergone great change. Complicated partnerships were common necessities of trade when arithmetics began to be printed. Stock companies were still a couple of centuries in the future. Partnership involving some complications as to time were matters of daily interest.

The arithmetics of New York City make little of this to-day, but it still is found about the state, and even in the city schools it is no doubt introduced by some teachers with mathematical turn of minds. But what a lesson the evolution of arithmetic gives to us as we consider it! To-day the time and energy so recently devoted to this chapter may well go to an understanding of the mechanism of and the problems met in the stock company which has so entirely replaced the old-style complicated partnership.

5. PROPORTION. For a long time the arithmetics often gave separate chapters on proportion and "rule of three," not recognizing their identity. The one had come from the western world, and the other from the eastern, and had been placed in the earlier works as distinct. As evolution progressed, a single chapter appeared, but with the same old problems. A type of these problems was that of a laborers doing some work in b days, the question being as to how long it would take c laborers, or how many laborers could do it in d days.

To-day the best teachers have rather generally agreed to eliminate compound proportion, as a subject never really explained, and never used save as we neglect a better method of solving certain problems. But simple proportion remains, partly because it gives some exercise with ratios, these being valuable concepts.

But what teachers, looking at the subject from the standpoint of evolution, will not be convinced that the obsolete problems, and the makeshifts of explanation that are found in most chapters on proportion should give place to a more modern treatment?*

6. PERCENTAGE. Since so much of our applied arithmetic has to do with percentage, a glimpse at the evolution of this important subject will be of value. Percentage is modern. It could not amount to anything until decimal fractions became generally known. The decimal point was first used in 1612, but it was more than a century later that decimal fractions were commonly understood, and another century elapsed before decimal scales (like those of United States money and the metric system) began to occupy the attention of the business world. So percentage may be said to have taken its important position in the nineteenth century. Its problems are not, therefore, so antiquated as those of proportion and partnership.

But business customs are constantly changing, and we already find much in percentage that gives a false notion of business. In the first place, the very school terms, *percentage*, *amount*, *difference*, and even *base*, devised during the era of solving all problems by rule, are unknown (as used in school) in business. In daily life we do not use the word *percentage* to mean the product of *base* and *rate*, and we do not use the words *amount* and *difference* (in relation to this subject) at all. Likewise in business we do not deal in fractions of a share of stock, nor with stock quotations that do not run by eighths, nor with quotations independent of the brokerage, nor very often with stocks that pay dividends of more than about 6% on the investment. But it is rare to find an arithmetic that does not put all these false ideas of business before its readers. The teacher's duty is to recognize the subject as in a state of evolution, and to eliminate those problems and that treatment that gives a false notion of business.

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* I have set forth this treatment in the *Higher Arithmetic* already mentioned.

Our arithmetics also have something to say of Profit and Loss, which is certainly commendable as showing gains and losses in trade, but which is open to the objection that the expression as used in arithmetic has not the technical meaning now common in business. The evolution of commercial usages and language has made the profit and loss expressions of a century ago not those of to-day.

We have another relic of the past in a certain problem in brokerage that has outlived its usefulness. It is the one which describes a man as sending $1,000 to his broker, instructing him to buy as much corn as possible at 2½% commission, the amount sent to include the purchase price and the commission; the corn being purchased at 50 cts. per bushel, required the number of bushels purchased and the broker's commissions. The result, $1951.21\frac{39}{41}$ bushels and $\$24.39\frac{1}{41}$, is, of course, as absurd as the problem. In the first place, this is not the way this kind of business is done to-day; it may have been done so once, but it is not done so now. The rate of commission is not that of this generation, and the whole transaction sets up a false picture of the business it pretends to portray. It may be argued that the problem has reasoning in it, and that this is what we seek, but we can obtain this without giving a pupil an idea of trade entirely antiquated.

7. COMPOUND NUMBERS. We still have, in America, the cumbersome compound numbers that a large part of the world, with the notable exception of England, has discarded in favor of the simpler metric system. Having these, we must still teach them, and must continue to exercise children in reductions. But unfortunate the teacher who is not aware of the fact that the whole matter is in a state of evolution.

Cocker was doubtless justified two centuries ago in asking, "In 47 C. 1 qr. 20 l. how many ounces?" And possibly in setting a problem like this: "I demand how many furlongs, poles, inches and barleycorns will reach from London to York, it being accounted 151 miles?" We find similar problems in Daboll and in Pike, in our own country a hundred years back. Indeed, when we come to consider it, do we not find problems as antiquated in fact if not in style in the arithmetics of to-day? Whereas the tendency for the past twenty-five years been rapidly away from compound numbers, especially from those involving more than two denominations at once, we still set forth as the standard problems in our arithmetics those involving several denominations. Do we not place before children problems as elaborate as the reduction of miles, rods, yards, feet and inches to inches, not occasionally merely, but quite generally? That is, are not the set reductions of arithmetic those of numbers of three or more denominations, while those of life involve numbers rarely exceeding two?

It is the same with operations involving such numbers. We do need to know how to add 4 ft. 5 in., 5 ft. 9 in., 10 ft. 3 in., and so on; but we rarely hear of a practical problem requiring the addition of 6 yds. 2 ft. 7 in., 10 yds. 1 ft. 11 in., 5 yds. 2 ft. 6 in. Once such problems had place in daily life, but the decimal fraction has gradually eliminated them. This is seen in the fact that land surveyors, only a few years ago, expressed results in acres, square rods, square yards, and square feet, whereas they now express them in acres and decimal fractions of the same, or, in the cities, in square feet.

In view of all this, what is our duty in teaching the subject? Manifestly to pay relatively little attention to the elaborate reductions still found in all our arithmetics, but to bring our pupils to become skilful in handling the practical ones of two, or at most three, denominations. They contain the theory as fully as do the more elaborate ones, and at the same time they represent the present state of the subject in America.

8 MENSURATION. Hardly anywhere does the evolution of arithmetic appear more marked than in the work in mensuration. The measuring of casks, masts, sails and cisterns, so common in days of universal wine drinking, of commerce in sailing vessels, and of the ancient means of storing water, has largely disappeared. Computations of the amount of carpet necessary to cover a floor have, however, become more common as wealth has increased, and the same may be said for problems relating to wall-paper. Few of these are, however, of much practical value, the pattern of paper and carpet, and the border of the latter, not being usually taken into consideration. In other words we have perpetuated one of the standard old problems, "How many yards of matting that is two foot wide, will cover a floor that is 24 foot long and 20 foot broad?" but we have made it of less value by putting a pattern on the matting and by neglecting the modern fashion of carpet-laying.

In one thing we have, however, made a decided improvemen of late years; we have discarded using the arbitrary rules of mensuration unaccompanied by any explanation or reason. Fe arithmetics are now found that do not embody enough constructive geometry to allow a pupil to visualize the subject of measurement.

It may be doubted, however, if a considerable amount of our work in mensuration, particularly that referring to the cone and the pyramid and their frustums, has any place until the pupil reaches geometry. It is also doubtful if the mensuration of the sphere is of enough value to warrant its insertion in any elementary work. Time was when few studied geometry, and the demands of the workshop required all this; but those times have given place to entirely new conditions.

9. "SHORT CUTS." It is not so very long ago that "short cuts" in multiplication, in reckoning interest, in extracting roots and in reduction were practically necessary and were found in all arithmetics. We still have some of them, not so commonly in the city as in the country schools however. Now what is the reason for this change of taste? It is very simple. Within a little more than a century we have had grow up a large number of tables for the assistance of the computer. Logarithms, invented about three centuries ago, have become common, even entering into the grade work of the German schools. The navigator needs no "short cuts" for making his reductions in longitude and time, because he has tables at hand that do all this for him. The engineer needs none for extracting roots, for his tables perform all this tedious work for him. The banker cares nothing for the many rules for the ready reckoning of interest, for his tables furnish him the required results at a glance. Indeed, it may be doubted if the rapid accountants of the past will be needed in the next generation, when the remarkably ingenious comptometers, arithmometers, calculating machines and cash registers of the present have become common through their decrease in cost. The demand for penmen who were both rapid and distinct has given place to that for stenographers who manipulate the type writer. Just so the master of "short cuts" has given way to the one who can use tables without making mistakes. The next generation may see this one give place to the one who can skilfully play the keys of the arithmetical machine.

What is the lesson of all this? It is that the time and energy formerly, and sometimes now, devoted to "short cuts" would better be given to understanding the processes, to acquiring an insight into the business customs of to-day, and to the ability to do accurately what has to be done, checking each operation as one proceeds.

10. APPROXIMATIONS. In my work on *The Teaching of Elementary Mathematics.* * I have called attention to a demand very properly

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*New York, Macmillan, 1900, to which work reference is made for the elaboration of much that is suggested in this paper.

made by those who have to do with the practical calculations of mechanics, but which is not yet sufficiently recognized by American teachers. Langley, of Bedford, has brought it before English teachers in his elegant little manual on Computations, and most German schools recognize it quite early. The demand is for a knowledge of approximate computations. In the work to which I have referred I have said: "There is a feeling among many teachers that some virtue attaches to the carrying of a result to a large number of decimal places, and hence this is rather encouraged among pupils. As a matter of fact the contrary is usually the case in practice. If the diameter of a circle has been measured correctly to 0.001 inch there is no use in attempting to compute the circumference to more than three decimal places, and 3.1416 is a better multiplier than 3.14159. The result should be cut off at thousandths and the labor of extending it beyond that place should be saved.

"Now since we rarely use decimals beyond 0.001 except in scientific work, and since *no result can be more exact than the data*, and since even our scientific measurements rarely give us data beyond three or four decimal places, *the practical operations are the contracted ones*, those which are correct to a given number of places. For this reason, in this age of science, approximate methods are of great value in the higher grades which precede the study of physics. The following are types of such work:"

10.48		10.48
3.1416	3.1416)32.92	31416)329200
31.44		3142
1.048		150
0.419		126
0.010		24
0.006		24
32.92		

In other words, in the evolution of applied arithmetic we have reached a new stage,—the recognition of the value of the decimal fraction as a means of expressing mathematical approximations which should accompany the physical approximations that we must always have. The grade teacher may not feel it her duty to teach the algorisms of approximate multiplication and division, but she certainly needs to know and teach that the arithmetical result cannot be more accurate than the physical data.

11. EXCHANGE. The school curriculum of New York City is no exception in requiring, and very properly, the subject of Exchange. But there is scarcely a topic in the whole of applied arithmetic that developed more during the nineteenth century. This evolution schools have been slow to recognize, and we still have, in a majority

of the text-books actually in use in the country, problems that represent the commercial life of England of two generations ago, but not at all the life of America as we know it.

In the early days of exchange there were not many banks; indeed, none at all as they commonly exist to-day. Travel was difficult, money transmission and financial transactions generally were slow. As a result "days of grace" and time drafts were to be expected. This has all been changed. To-day a considerable number of states have abolished "days of grace," and the time draft is now the uncommon rather than the common form.

But the demands of business have made other kinds of exchange even more common than the sight draft. The personal check (which may be called a kind of local draft), the express and postal money order, and even the telegraphic order have all come into the commercial life as very real methods of exchange. It may be said that the principle is much the same as in the case of the old-fashioned time draft, but the business practice is different, and this practice our pupils need to know.

All this means that the teacher who presents the subject of exchange, whatever text-book may be used, should be familiar with the new systems, those that the pupils will be apt to use, and should present the subject of time drafts only as the last one in the chapter. Blank checks, money order forms, the explanation of telegraphic exchange, these should come before every class at the present day.

12. SUMMARY. From this rapid sketch of some of the most obvious changes in arithmetic as the science has unfolded, it will be seen how valuable it is for the teacher to work the field of history. The method of teaching proportion, for example, depends largely on what we expect to do with the subject, and this depends upon the state in which it now is in the historic evolution of arithmetic. The same is true of any other topic of the applied portion of the science. The author's work on *The Teaching of Elementary Mathematics* (Macmillan), Beman and Smith's translation of Fink's *History of Mathematics* (Open Court Publishing Co.), the popular histories by Ball and Cajori, or, better still, the German works by Unger.* and Sterner † will be of service to the teacher caring really to study this phase of the subject.

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* *Die Methodik der praktischen Arithmetik in historischer Entwickelung.* Leipzig, Teubner.

† *Geschichte der Rechenkunst.* München, Oldenbourg

Some Common Sense in Teaching Arithmetic.

By J. M. GREENWOOD, Superintendent of Schools, Kansas City, Mo.

MUCH of the confusion in teaching arithmetic arises from obscure thinking in regard to the scope and character of mathematical concepts. These concepts are both geometrical and arithmetical, hence it is that one man would use up all the timber in the world for the purpose of starting the children in the right direction of mathematical study, while another, equally as conscientious, would start beginners with the concepts of number whose relations to one another and their various applications to concrete objects and other natural phenomena should be studied from this view point. A little reflection will be sufficient to convince one that geometrical magnitudes stand in the mind for images of things and concepts, or products of the imagination and of thought. To think of a triangle, a square, a cube, a sphere, or any other geometrical magnitude, will indicate this dual form—the image which is individual, and the conceptual relation which is general. Upon the other hand, the concepts of number depend upon certain relations of objects to time. Things that are numbered seem to occur in a continued series, and they must be such things as the mind recognizes as having a definite relation to each other in the order of succession. The mind then gathers up these objects into groups, breaking the series into parts, or putting the parts into a whole, thus making larger or smaller groups at will. To number is to count. As space gives validity to geometrical concepts, so time, in the act of counting, involves both objective and subjective relations. These relations are susceptible of the most varied applications, whether material or spiritual things. Well has it been said "that any series of objects can be used as the symbols of number." Regarding number as a continued series, the chief concepts are the unit, the sum, the difference, the multiple, the divisor, the ratio, the power, the root.

In passing, it is pertinent to remark that number can be applied to magnitude as well as to a continued or discrete series. It is a matter of indifference whether it be applied to spatial or time relations. Pure geometry, as understood by mathematicians, deals exclusively with ideal constructions in ideal space, and pure arithmetic and algebra with ideal concepts in ideal time. Number, as thus employed, is simply a name for diversity. Jevons says: "Exact identity is unity, and with difference arises plurality."

Premising the foregoing as a background, it is comparatively easy to understand *why* teachers regard the teaching of arithmetic under so many different conceptions. Some attack from the concrete geometrical conception, and others from the arithmetical, and others again use modifications of them, while not a few proceed tangentially from *nowhere* to the *unknown* and *unexplored and terminate at the same place.* These divergent views have given rise to the numerous devices, tricks and schemes with which so many of our educational papers are filled for teaching arithmetic successfully to children. With the advent of material illustrations in scientific teaching generally, the shoe-pegs, grains of corn, toothpicks, and all sorts of "do the sums," have marched into the primary rooms, and are regularly enthroned there. Everything now is to be elaborated and over elaborated. No wonder then that the "dance of arithmetical death" is going on with unabated zeal.

I shall endeavor to build up, not to destroy; but if I enter upon the work of destruction I hope to construct something better than what I destroy. Were teachers generally larger than the devices they practice, then my task would be a very easy one. There is a place and a time to use material objects in fixing a principle or in illustrating a problem, but there is also a time not to use these helps, and it is a continuous parading of helps which darken the clear and the simple and befog the understanding.

To put the question in its lowest and most concrete form, suppose a child six or seven years of age is sent to school, what is the best way to build up in its mind a body of knowledge which is usually included in the term "arithmetic"? To this question I address myself, for the obvious reason that what does apply to this particular child will likewise be applicable to all the normal children of a group of similar attainments.

To begin: If the child cannot count, it should be taught to do so, which may take a few minutes a day for a week or two. In my experience I have never yet found a child six years old, one that was normal in mind, that could not count to ten, twenty or a hundred, perhaps. I have tried children from all conditions of life in this country, of native and foreign birth, and they could always count some, and when teachers have said, "this one or that one or that one cannot count," I have found that the teacher had not approached the child in the right spirit. Although it may be possible, and no doubt probable, that some parents make no effort to teach their children to count, yet I am of the opinion that such cases are extremely rare. But a little practice each day will soon enable a child to count objects correctly. The second step is to teach the child the figures from one to ten, and that these figures stand for objects or things. If the child be given the opportunity, its knowledge of reading and writing numbers will soon run ahead very rapidly, just as it does in making out new words from the little reading books.

The child's attention may be directed to the fact by its own processes of comparison, that of two like things one may be larger or smaller, or of the same size of the other. The child may work with concrete objects and with the figures which are symbols of things, letting the work be about equally divided between the two kinds. The reason for this double phase is that all work in arithmetic will soon run into symbols, and that nearly all the learner's thinking will eventually be symbolic. Every letter is a symbol of a sound, every word the sign or symbol of an idea, and every sentence the sign or symbol of a thought.

The fundamental fact is to build up in the child's mind the idea of the material thing as such, followed by the symbol which stands for the object. Just as one teaches the little child the sound of a letter, and then the letter as the written sign of the sound. The sound is one thing, the sign another, which stands for the sound itself. Thus, the learner passes almost insensibly from the thing to its signification. The best method is undoubtedly to build up the basic elements from things, but there is great danger in keeping up thinking in things too long in the educative process. However, things should be used whenever they are needed for purposes of illustration or fixing a principle; but the present tendency is to rely on them too much.

The intellectual effort required of the child in primary number teaching is no greater than the child uses in all other school exercises. In fact, it begins to count as soon as it acquires the habit of using words, and it is not particular whether it counts wholes or parts, and it is owing to this tendency that the young child uses fractions as readily as it does units. It works and uses both from the very earliest years. Along with beginning concrete work, the child should learn to read and write numbers—both integral and fractional.

A simple illustration will perhaps make the foregoing clearer. As soon as the teacher has ascertained that the pupils can count, say to ten, twenty, or a hundred, the class should be supplied with yard-sticks and twelve-inch rulers. If the pupils do not know how long the yard-stick is, they can, under the teacher's direction, measure it with three one-foot rulers. It is better to put the rulers end to end on the yard-stick, so that the pupils can see that three of them are equal to the other. This is the method we have of measuring the longer by the shorter. From manipulation it is easy for the child to see that three feet in length will equal a yard. Furthermore, the other relations, namely, that one foot is one-third of a yard, two feet two-thirds, three feet a yard, and so on, are easily and naturally grasped. From the yard and the foot, thirds can be obtained out of the material relation existing between two measures and it is now only a short step to writing the symbols on the board for the children to read. For a time they will think *thirds* in objects, yet by the use of the fractional symbols, they pass to the sign and into which they put the meaning, while retaining the original concept. After they have reached the clear, precise conception of the third and to which they will refer all other thirds, they will read fractional thirds with as much ease as they read whole numbers, and it makes no difference whether the thirds be proper or improper fractions. As another illustration, take the table of liquid measure. From this, by letting the children do the measuring, other fractions can be learned. The children can measure water, sand, or any other material that will fall under this table, and if the pint is taken as the unit of measure, halves, fourths and eighths are developed, and if gills be used, the fractions in this series will run up to *thirty-seconds*. This process involves reduction ascending as well as reduction descending. When the concept is clearly fixed, the child's mind then passes to the arithmetical symbol by writing it on the board. Without pursuing this line further, I will say that by the time the child passes through the second grade, it will have learned, by doing, nearly all the common tables in the arithmetic, and they will be learned in such a way that they will not be easily forgotten. Sevenths can be derived from the days of the week; fifths and tenths from the penny, the nickel and the dime; sixths and twelfths from the foot ruler. This represents one line of work, but carried along with it, should be the mechanical or drill side,—the two kinds about equally divided.

In all this work, it is evident that a concept (having its basic element in the object which the child has learned to handle physically and mentally) is formed in the child's mind at first, and when it reasons it employs a real thing which is present constructively in the imagination. This lays the foundation for thinking things, and after which the transition is easily made to the symbols or signs, and as the child progresses in the study, gradually the signs and symbols are substituted for the things. This forms a rational basis of work, and if the metric system should come into general use, the method would apply as well to it as it does to our varying tables used in arithmetical work at present.

Let it be kept constantly in mind that these things are helps only, and as soon as the child can work without them, they should be cast aside. Enough and not too much is the only safe rule.

The two sides of arithmetical work for beginners have been emphasized—neither, I trust, unduly. This may be expressed in another way—the development of the subject, and the mechanical drill. I prefer a union of the two, or rather that neither should overlap, or displace entirely the other.

Stated generally, the plan is that of concrete development of each subject, illustrated and fixed in the child's mind, to be followed by well-chosen progressive drills. All number work should be well planned, and each lesson with respect to some well defined specific aim of what has preceded and of what is to follow. Much of arithmetic work consists in finding out how many times one thing is greater or less than another; but these ideas do not include all that can be brought under the domain of arithmetical computation. The problems of practical affairs are various and the elements so unlike that uniformity of procedure must depend entirely upon the skill and judgment of the computer. When it comes to living things, other elements than mere sameness of name or groups must be taken into account. Were all objects numerical or geometrical, then the application of arithmetical principles would be greatly simplified. The applications are far-reaching in their consequences; but the beauty of the subject consists in the wide range to which numbers can be applied.

So far, I have sketched in a general way some underlying ideas, and unless one catches the spirit of how the teaching should be done, the suggestions will have little value. It takes a live teacher to do the work I have in mind. It will not work itself in the minds of children except very slowly, hence I think it important to emphasize more specifically another fact, namely, the drill side.

The greatest things to be attained by the pupil is to *know what is given in a problem, what is required, what must be done, how it must be done, and absolute accuracy in mechanical processes of adding, subtracting, multiplying, dividing, raising to powers, extracting roots, using tables, and pointing decimal results.* Various mental recipes or prescriptions have been tried with more or less success to insure absolute accuracy in these things, and the problem is still unsolved.

After much experimenting among children I am satisfied that ninety-five per cent. of them have some device for adding one figure to another, and that it is usually somewhere from the third to the fifth school year that they begin to add by seeing instantly what two figures make when added. Suppose that 9, 6, 8, 7 be written in a perpendicular column, and that children in the first, second, third or fourth grade be asked to find their sum; the sum is found usually by using 1's, and by counting on the fingers, motions in the air made with the fingers, dots or marks on the slate, marks, circles or objects counted on the wall or ceiling. . Some may count by 2's or 3's or 4's. If the children have been scolded much by the teacher they will conceal the how lest they incur censure. But when I have wanted to know of a child when it began with the 9, what it thought of when it put the 6 to the 9, I have invariably reached the process. The younger child devises schemes or learns from others how it is done. On inquiry among a large number of young ladies, high school graduates, they assured me that they, when down in the low grades, counted by 1's, using some device; and a few told me that even now, sometimes, when confounded in adding, a long column of figures, they occasionally resort to the schemes of their earlier years.

The teachers who have fumed and fretted about these devices, I believe have strangely overlooked the essential feature in trying to teach children too many combinations of figures at once. If one combination at a time is taught and then drilled upon till the mental reaction becomes automatic, the device difficulty is eliminated. Suppose it be required to teach a pupil, or a class, 8+7, then 18+7, 28+7, 38+7, 48+7, and so on till the putting of these two digits together in addition will always give 5 as the first figure. Fix this fact well before another is taken up. It must be known as readily as the learner recognizes the two figures to be added, and so with all the other combinations of which nine digits are susceptible. When the teachers take up combinations they try to do too much at once. When a fact is once learned, work at it until it becomes automatic, or intuitive, if one prefers that term. It goes without dwelling upon it, that the process of subtraction and the multiplication table must be learned in the same way. The idea that a pupil must spend three or four years in doing the multiplication table, instead of learning it by mere force of the will, is the veriest nonsense, and can find no lodgment except in crack-brained pedagogy, or in the insane vaporings of an educational philosopher. When I was a child, my teacher told me at noon that I must learn the multiplication table, and the next morning I had it. I knew some of it, the *fives*, *tens*, *elevens*, and I have not forgotten it.

The science of arithmetic has terms which have definite meanings, signs that indicate specific operations, numbers that suggest certain things for which they stand. In the learner's mind these terms, signs and numbers must be learned and their meaning understood. Exactness is demanded in the use of these terms, so that when one is mentioned the learned knows what it stands for. The technical vocabulary must be mastered as the pupil encounters the terms, signs and tables as he comes to them. Precision is of the utmost importance here. It clarifies nebulous thinking.

Perhaps I should remark again that the best way for a pupil to learn the tables of weight, measure, value, etc., is to do them first, but he should not be kept doing them always.

After a pupil has learned how to add numbers, why should he not get his addition in a lump? What sense is there in having simple addition at one time, addition of United States money at another, addition of denominate numbers at another, addition of fractions at another, and addition of decimals last? Is there any common sense in such a scrappy method of presentation?

How many new or confusing elements are introduced! A decimal point at one place, and in denominate numbers a varying scale. In the first and second grades, if the pupils have been taught as I have indicated, they will add, subtract, multiply and divide fractions just as readily and just as correctly as they do in whole numbers. Now what is true of grouping in addition is as applicable to subtraction, multiplication and division.

Down in the second and third grades is the place to teach percentage, perhaps with the exception of simple interest, and it can be taught there in its simpler forms if the teacher has sense enough to do it. Already the little learner knows what part one small number is of another. To illustrate my meaning, suppose the child or children be supplied with a foot-ruler, having inches marked off on it. With the ruler in hand the teacher asks: "6 inches is what part of 12 inches?" Promptly the response comes: "One-half." "3 inches what part of 12 inches?" "One-fourth, or one-quarter." And so on. "Now if 12 inches be 100 per cent. of itself, what will six inches be?" They will give the correct answer, and so on with the other parts, What is new in this relation? Just one word—"per cent." I need not dwell upon this. Should any Thomas doubt, I have no argument with him. I am dealing with facts as I see them every day among as fat, hearty children as the sun shines on.

Another grouping, and a very important one is that of the surface or area group, followed by the volume or solid group. As it is, the learner gets the tables in one place and the mensuration of areas and of solids in another, usually over at the back of the book. With the use of the tables, all mensuration problems, including triangles, squares, cubes, circles, cylinders, pyramids, cones, spheres, should be thrown together and treated together. The only new element is the ratio existing between the diameter and the circumference which has to be committed to memory for future use and usefulness. If the pupil sees that the principle involved in discussing triangles, squares, areas, cubes, etc., is the same as that in finding the volume of a wagon-bed, the cubic feet or yards in a cellar, or cistern, he perceives how each of these must depend upon a very few elementary notions, and he seizes upon the idea of a law running through all subjects of this character. It is a great exercise in thinking, especially in analysis, to have a pupil reduce a complex magnitude back to the most elementary notions upon which it depends. A word in regard to square and cube root may not be out of place in this connection. Let the building-up process first take place, followed immediately by the tearing-down process, or the *un*-multiplying process.

Any good teacher can teach all there is to be taught to a class of average ability in square and cube root in two weeks. And all that is good in Compound Proportion, if the "principle of *cause* and *effect* be used," in one week. But some people are so wrapped up with the form of expression in arithmetic, that they so hobble and stringhault the thinking powers of their pupils that they are incapable of movement.

Mental Arithmetic a few years ago was thrown out of many schools. That was a mistake. Every child should be well drilled in Mental Arithmetic; trained to work the problems without the aid of pen or pencil; trained to hold the conditions of a problem in mind; to separate the given elements from those required, and to perform the mental operations in the mind. There is no figuring drill in arithmetic that can give the pupil so much mental power as Mental Arithmetic when properly taught. It and grammar are pre-eminently the logic of the common branches. To work in Mental Arithmetic the pupil must discriminate sharply between what is *given* and what is *required*. He must know from the signs of the problem what to hunt for. This is the first important step, and the next is to know when and how to find what is wanted. To carry out these thoughts the teacher should observe the following directions: 1. Read or state the problem once very definitely, but not oppressively so; 2. The pupil or class will give the answer to the problem; 3. The pupil or pupils separately will state the problem; 4. The pupil, or pupils separately, will give a short connected, logical analysis (not in set words) followed by the conclusion; 5. The pupils must not use the text-book during recitation, or cipher out the problems before the recitation; 6. The pupil must be trained to listen, to think accurately, rapidly and connectedly; 7. The pupil must hold all the conditions of the problem in mind, while he proceeds step by step to the conclusions; 8. To fix a problem, or a class of problems in the pupil's mind, vary one of the conditions after another, and let the pupil solve the problem thus varied till he has mastered the class-type; 9. The pupils should not commit the problems to memory.

In conclusion, I am firmly convinced that if arithmetic is taught in the manner I have briefly hinted at in this paper, the time can be reduced in teaching it at least two years. It is spread out now so thin, that it is too little at both ends and very slim in the middle.

First Lessons in Number.

By Emerson E. White, LL.D.

IN no other school art is philosophy less helpful to the teacher than in the primary lessons in number; and yet nearly every new method of teaching number is heralded by the claim that it has a sure philosophic basis. This is an old trick in pedagogy—one that has been used in exploiting new methods and devices in nearly every branch of instruction. While the ordinary teacher gets no clear conception of the principles proclaimed, he supposes that they must be bed-rock philosophy, and so gives a willing ear to the new method which is to revolutionize the teaching art.

In recent years much stress has been laid on the genesis and nature of number as the basis of a true method of teaching number to children. Fortunately, these facts fall in the domain of observation and experience. They clearly belong to the science of number, not to its philosophy.

In another place we have fully discussed these questions, and it must suffice to say here that the ideas of number first in the mind of the child and the race answer the question "*How many?*" They are occasioned by the phenomena of nature, or, if preferred, by environment and subjective experience. The mind discriminates between one and more than one and the idea of number arises.

There is nothing in the child's environment or experience that justifies the claim that the first ideas of number are occasioned by quantitative measurement, or, what may be clearer, by the measurement of concrete magnitudes. There is not in all nature as it touches the child any two visible objects whose quantitative equality or ratio can be determined by observation, and certainly subjective or psychical phenomena have no quantitative relations. These facts show that number ideas can not have their origin in quantitative measurement and that early numbers do not express quantitative relations. The child's first number ideas not only denote how many, but they are applied to numerous objects that have no known quantitative equality. Hundreds of objects first numbered by the child have no such equality. The expressions "three children," "three horses," "three leaves," "three stars," etc., do not involve the idea of equal-

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"The Early Teaching of Numbers as Ratio." American Book Company, N. Y.

ity. The children may be of unequal age and the horses, leaves, and stars of unequal size. Indeed, not even space relations enter into the child's ideas of number, for these ideas often relate to subjective phenomena and other objects that have no space relations. Speaking more technically, the child's first ideas of number are qualitative, not quantitative. Moreover, the quantitative measurement of concrete magnitudes is not possible until artificial devices for such measurements are invented and used. These facts prove beyond question that the first number ideas of the child and the race denote how many, and are not ratios. The idea of ratio is later and is, as Dr. McClellan asserts, "the result of development."

It is an error to assume that the mind can not discern the relations between numbers without sensing or imaging corresponding concrete magnitudes. The mind that can not discern that there are three 2's in 6 or that 2 is one-third of 6 without imaging concrete magnitudes that correspond to 2 and 6 is in the infant phase or is near the dunce condition in number power. Moreover, the sensing or imaging of numbers has a very limited possibility. A little training will enable the infant mind to image from one to ten objects readily, and, by grouping, a few numbers above ten may be imaged, but this imaging of numbers soon reaches its limit, as well as its utility. Besides, it is not possible for the mind to image even denominate numbers that denote time, force, energy, and other non-space quantities.

Further, the habit of imaging numbers in corresponding concrete magnitudes is a serious obstacle in acquiring a true knowledge of numbers. In Galton's "Inquiry into the Human Faculty," examples are given of persons who have the habit of *visualizing* numbers. When, for example, the number seven is in the mind, the ghost of the figure 7 arises in the mind's eye, and, in some instances in a certain place in the field of vision. This abnormal habit is not much more undesirable than the habit of imaging certain material objects as the symbols of numbers. The pupil who reaches the fourth school year unable to compare numbers without first sensing corresponding magnitudes is in an almost hopeless number condition. To such a mind the rapid and accurate addition, subtraction, multiplication, and division of numbers, is not possible. This is not a case of "arrested development" for there has been no true number development to arrest. A child, if properly trained, early acquires the power to discern and compare numbers without imaging concrete objects to represent them. It is a serious mistake to assume that children are number dunces.

These facts justify an earnest caution against the making of the measurement of concrete magnitudes too prominent in early lessons in number. Such measurements have a place, especially in dealing with denominate numbers, but they should not be made the *basis* of number training. It is true that exercises involving the manipulation of geometrical blocks, the foot-rule, the pint cup, etc., may be made very showy, and, it may be added, very deceptive. The limited number of comparisons possible may be repeated over and over until the pupils outdo those earlier number prodigies who, by their feats in the mental analysis of problems, so astonished the old-time teachers. Whatever may be the value of such exercises in the actual measurement of magnitudes, they have small value as a preparation for the higher phases of arithmetical instruction or, indeed, for practical life. Nine-tenths of the pupils in our schools will give only a small fraction of their time in after life to the use of the yardstick or the balance, and those whose life-work involves the arts of measurement will use a more certain process than *inspection*.

This suggests the fact that it is not possible to ascertain the exact ratio between two concrete magnitudes by observation or inspection, or speaking more accurately, to find the ratios of the numbers which represent such magnitudes; and for the good reason that it is not possible to find two numbers that will *exactly* represent the magnitudes. For example, it is not possible to ascertain by inspection the exact ratio of the solid A to the solid B. It may be seen that B is about 3 times as large as A, and hence that A is equal to about ⅓ of B. It is clear that there is no quantitative accuracy here. Besides, the error in teaching that the solid A is ⅓ of the solid B is obvious for, being *separate* magnitudes, A is no part of B. The most that inspection can *disclose* is the fact that the solid A equals about ⅓ of the solid B. This may be an *approach* of the mind to the idea of exact ratio, but it is not the way in which the mind reaches such an idea.

It is thus seen that the methods of teaching number to children should not deal exclusively with concrete numbers, and especially with numbers represented by measured magnitudes. They should also train the mind in the easy grasp of abstract numbers and give facility in discerning relations between such numbers. In no other study is it more important "*to unsense*" the mind. The initial steps in teaching numbers and number processes include (1) numbers represented by groups of objects in sight (objective); (2) numbers represented by objects not in sight but easily imagined or imaged; and (3) numbers not applied to sensible objects, that is, the so-called abstract numbers. These three steps may be taken in the same exercise or in different exercises.

In the first year the emphasis is properly placed upon *objective* exercises. In these exercises a variety of objects should be used and uniformity in the manner of presenting them avoided. Care should be taken not to continue these objective exercises too long. It is possible to keep young pupils numbering, combining, separating, and comparing objects in sight so long that it is not easy to unsense their idea of number—to secure their easy apprehension of number without reference to visible objects.

Special care should be taken from the first not to confound numbers and objects. "Show me the number three," says the teacher, and a pupil holds up three fingers, thus probably confounding the group of fingers and the number three. Such a direction should be avoided. It is not the group of fingers that is the number three, but the *threeness* of the group—the *how many* fingers in the group. Care should also be taken later not to confound numbers and figures or other number symbols.

When denominate numbers are used, and they may be used early, the pupils should be made familiar with the units of measure by their actual use in measuring. The measures may also be used with great advantage in comparing denominate numbers, and in finding what part one denominate number is of another, as the part 3 quarts are of a gallon, 4 inches of a foot, etc. But here again care should be taken not to use the measures or measured magnitudes too long. Measurement is not an end of number training but only a means to an end, and when pupils can compare denominate numbers without the presence of the measures, this should be done. When, for example, pupils instantly discern that 3 days are three-sevenths of a week and 6 hours ¼ of a day, they do not need to inspect a foot-rule to see that 4 inches are ⅓ of a foot. It is a mistake to keep pupils manipulating blocks, foot-rules, etc., until visions of these objects fairly haunt their number processes.

Whatever be the objects used in the first lessons in numbers, pupils should soon pass from objects in sight, to those not in sight, then to those that cannot be visualized, as numbers denoting time, and early, but not too early, to abstract numbers. Emphasis would properly be placed upon this last step but for the fact that so many teachers are still using drills on abstract numbers to the neglect of needed objective and concrete exercises - a practice largely due to the fact that drills on abstract numbers are easier than objective instruction. This is not only true of drills in number, but in all branches it is easier to drill pupils on words and other symbols than it is to teach them real knowledge—a fact sadly illustrated in the memoriter, word, and figure work, which has so long characterized school training. Care should, however, be taken to avoid the opposite extreme of exclusive objective training—of keeping young pupils swinging on the gate of sense. No abstract ideas are so early grasped or so easily manipulated by children as those of number, provided always that these are properly approached and taught.

First Steps In Primary Arithmetic.[*]

By W. W. Speer, Asst. Supt. of Schools, Chicago, Ill.

Finding Solids.—Place spheres, cubes, cylinders, and ot forms of various sizes in different parts of the room where the c dren can find them.

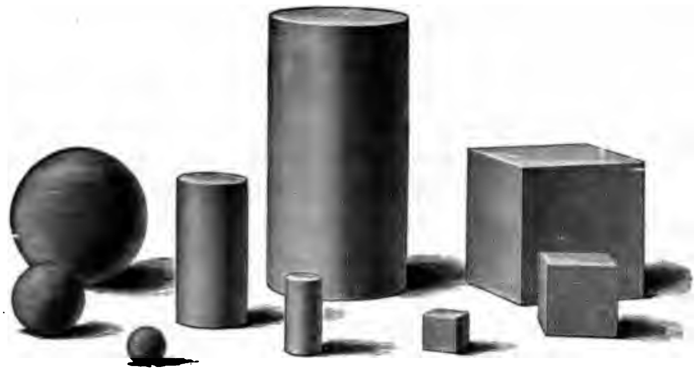

Fig. 1.

Show a sphere to the pupils. Ask:

1. What is this ?

Find other balls or spheres.

Find a larger sphere than this. Find smaller ones.

2. Name objects like a sphere. Example: An orange is a sphere.

3. What is the largest sphere you have seen?

What is one of the smallest spheres that you have seen?

4. To-morrow tell me the names of spheres that you see w going from school and at home.

Finding Colors.—Provide, ribbons, worsted, cards, etc., different colors, to be found by pupils when looking for a part lar color.

Pin or paste squares of standard red and orange where t can be seen. Pin the red above the orange.

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[*] Published by permission of Ginn & Co.

1. Find things in the room of the same color as the red square. What things can you recall that are red?

2. Look at the orange square. Find the same color elsewhere in the room. Recall objects that have this color.

3. Close the eyes, and picture or image the red square. Now the orange square.

4. Which square is above? Which below? Name the two colors.

5. To-morrow bring something that is red and something that is orange. Also tell the names of orange or red objects that you see in going to and from school.

HANDLING SOLIDS.—Cover the eyes.
Have a pupil handle a solid. Take it away.
Uncover the eyes. Pupil finds a solid like the one handled.
Cover the eyes.
Give pupil a solid. Take it away, Give him another.
Are the solids alike?
Which is the larger? Which is the heavier?
Repeat the exercise from day to day.

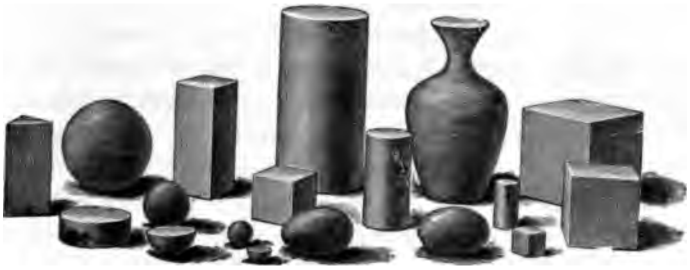


FIG. 2.

RELATIVE MAGNITUDES.—Place a number of solids on the table.
1. Find the largest solid. Find the smallest solid.
2. Find solids that are larger than other solids.
Ex.: This solid is larger than that one.
Find solids that are smaller.
3. Name objects in the room larger than other objects.
Ex.: This eraser is larger than this piece of chalk.

CUTTING.—Let the pupils at first cut and draw what they choose. After a number of daily exercises, when they have gained some command of the muscles, let them try to cut in outline objects which you place before them or which they have seen. Let the work be simple.

The drawing and cutting should be done freely, without the restraint of definiteness. If you ask more than the pupil can easily represent, the strained, unnatural tension interferes with free muscular action. In the slow and painful effort to represent perfectly, the mind is absorbed in the parts and is prevented from seeing the whole. A *premature* demand for definite action is a fundamental error, in that it separates thought from expression.

Building.—Have pupils build prisms equal to other prisms.

Teacher shows a prism and the pupils build.

Hold the attention to the relative size. This is the mathematical element.

Avoid the analysis of solids until the habit of recognizing them as wholes is formed. Do not ask for number of surfaces, lines, corners, etc. Such questions, if introduced *prematurely*, tend to destroy self-activity, to interfere with judgments of relative size and with the power to see relations.

Ear Training.—Have pupils listen and tell what they hear.

Have pupils note sounds when various objects are struck.

Pupils close eyes. Teacher strike one of the objects. Pupils tell which was struck.

Teacher strike two or more objects.

Pupils tell by the sound the order in which they were struck.

Train pupils to recognize one another by their voices and by the sounds made in walking.

Pupils close eyes and listen.

Drop a ball or marble two feet, then three.

Pupils tell which time it fell the farther.

Touch and Sight Training.—Pupils handle solids:

1. Find one of the largest surfaces of each solid.

Ex.: This is one of the largest surfaces of this solid.

2. Find one of the smallest surfaces.

3. Find surfaces that are larger than other surfaces.

Ex.: This surface is larger than that one.

4. Find surfaces that are smaller than other surfaces.

5. Compare the size of other surfaces in the room.

6. Find the largest surface or one of the largest surfaces in the room.

7. Close the eyes, handle solids, and find largest and smallest surfaces.

8. Cover the eyes; handle and tell names of blocks and of other objects.

Visualizing.—Place on the table three objects, for example: A box, a book, and an ink-bottle.

1. What can you tell about the box? About the book? About the ink-bottle? Which is the heaviest? Which is the lightest? Which is the largest?

1. Look at the three objects carefully, one after another.

2. Close your eyes and picture one after another.

Cover the objects.

4. Think the objects from right to left. From left to right.

5. Name the objects from right to left. From left to right.

6. Which is the third from the right? The second from the left?

When the position of every object in the group can easily be given from memory, place another object at the left or right. Add not more than one object in an exercise unless the work is very easy for the pupils.

When a row of five is pictured and readily named in any order, begin with another group of five. Each day review the groups learned, so as to keep them vividly in the mind.

FINDING CIRCLES.—Show pupils the base of a cup, a cylinder, or a cone, and tell them that it is a circle.

Conduct the exercises so that the doing will call forth variety of expression in telling what is done.

The correct use of the pronouns, verbs, etc., will thus be secured without waste of the pupils' energy. What the pupils see and do should lead to statements similar to the following:

That circle is larger than this one. I have found a circle that is larger than that one. Helen has found a circle larger than that one. He has found a circle smaller than this one. They have found circles larger than this one.

1. Find circles.

2. Find circles that are larger than others. Find circles that are smaller.

3. Find the largest circle in the room.

4. Find one of the smallest.

5. Find circles in going to and from school and at home, and tell me to-morrow where you saw them.

Notation and Numeration.

By M. A. Bailey, Teachers' Training School, New York City.

NUMBER SPACE—1000 to ∞

IN the teaching of notation and numeration by the French system, there are three number spaces. The first is from 1 to 10 because the plan of naming numbers discontinues the giving of an independent name to each number at ten; the second, from 10 to 1000 because the plan of giving an independent name after 9 of the last name has been repeated with each of the lower is discontinued at thousand; the third, from 1000 to ∞ because the plan of giving an independent name after 999 of the last name has been repeated with each of the lower is continued indefinitely.

Lesson I. Pupils should learn the names of numbers above a thousand by counting, and should continue the process until they see the value of periods and gain a comprehensive view of the plan of naming all numbers.

T. Count from 1 thousand. C. 1 thou, 1 thou 1, 1 thou 2, 1 thou 3. T. Count from 1 thousand 997. C. 1 thou 997, 1 thou 998, 1 thou 999, 2 thou, 2 thou 1, 2 thou 2, 2 thou 3. T. What is the largest number that begins with 2 thousand? C. 2 thou 999. T. Count from 1 thousand by thousands. C. 1 thou, 2 thou 3 thou, 4 thou. T. Count from 997 thousand by thousands. C. 997 thou, 998 thou, 999 thou, 1 thousand thousand. T. Right! We call a thousand thousand a million. Count from 999 thou 998. C. 999 thou 998, 999 thou 999, 1 million, 1 million 1, 1 million 2. T. Count from 1 million by millions. C. 1 mil, 2 mil, 3 mil. T. What is the next number of millions after 999 million? C. 1 thousand million. T. Right! We call 1 thousand million, 1 billion. Count from 999 mil 999 thou 998. C. 999 mil 999 thou 998, 999 mil 999 thou 999, 1 billion, 1 billion 1, 1 billion 2, and so on.

Lesson II. They should write the names of the periods for a time.

T. Write the numbers from 1 thousand representing thousand by thou. C. 1 thou, 1 thou 1, 1 thou 2. T. Write 2,999. C. 2 thou 999. T. Write the number next after 55,056. C. 55 thou 57. T. Write the number next before 1,000,000,000. C. 999 mil 999 thou 999.

Lesson III. They should discover that the names of periods, as well as the names of orders, may be omitted and expressed by position.

T. Write 263 spelling the orders. C. 2 hun 6 ten 3. T. Write without spelling the orders. C. 263. T. What change have you made? C. We have omitted the names of the orders with the understanding that the first at the right is units; the second, tens; and the third hundreds. T. Write two mil 683 thou 543 in a similar way. C. 2683542. T. What change have you made? C. We have omitted the names of the periods with the understanding that the first at the right is units; the second, thousands; the third, millions. T. Right! It would assist the eye if we were to indicate where each period ends. Who can suggest a plan? Mary. We might leave a little space between the periods. T. Good! You may all write the number in that way. C. 2 683 543. T. This plan is used by the Germans, but in this country it is customary to separate the periods by commas. Write the number and use commas. C. 2,683,543.

Lesson IV. They should discover that a difficulty arises when any of the periods are vacant, and they should endeavor to overcome it.

T. Write 1, 003,006 spelling the names of the periods. C. 1 mil 3 thou 6. T. Omit the names of the periods. C. 1, 3, 6. T. That might do because a comma marks the end of each period. Write 1 mil 6 thou omitting the names of the periods. C. 1,6. T. Is this 1 mil 6, or 1 thou 6? C. 1 thou 6. T. Write 602 spelling the names of the orders. C. 6 hun 2. T. Write this number omitting the names of the orders. C. 602. What have you done? C. We have used o for the vacant order. T. Who will write 1 mil 6 in a similar way? Henry. 1,0,6. T. That will not do because '0' holds a vacant order, not a vacant period. Write 2 mil 564 thou 367 without the names of the periods. C. 2,564,367. T. What are the names of the orders in each period? C. Hundreds, tens, and units. T. In 1 mil 6, what is units' period? C. 6. T. What should be the figure in hundreds' order? C. o. T. In tens' order? C. o. T. In units' order? C. 6. T. How should this period be written? C. 006. T. Who will write 1 mil 6 in this way? John, 1,000,006.

Lesson V. They should repeat the names of the periods forward and backwards with rapidity until they can name them mechanically.

T. In 2,738,463,456, what is the name of the left hand period? C. Billions. T. How do you know? C. Because the periods from the lowest are units, thousands, millions, billions. T. After billions, the periods are: trillions, quadrillions, quintillions, etc.

Repeat to quintillions all of the periods from the lowest. C. (They do so.) T. When is there occasion for using periods in this order? C. When we wish to learn the name of the highest period. T. What is the name of the highest period in 2,738,463,456? C. Billion. T. Repeat the names of the periods from the highest. C. (They do so.) T. When is there occasion for using periods in this order? When we read a number. T. Read 2,738,463,456. C. 2 bil 738 mil 463 thou 456.

Lesson VI. They have learned to read integers incidentally in connection with naming and writing them. It arouses interest to bring out the parallelism between the reading of numbers less than a thousand and of numbers greater than a thousand.

T. Read 368. C. 3 hun 6 ten 8. T. How do you proceed? C. We read the left hand order and name it; then, the next order and name it; then, the next order but do not name it because it is units. T. Read 4,365,476. C. 4 mil 365 thou 476. T. How do you proceed? C. We read the left hand period and name it; then the next period and name it; then, the next period but do not name it because it is units. T. In reading 368, do you point off into orders — 3, 6, 8? C. No. T. Why not? C. Because we can see where each order ends without this device. T. If you were to do so, why would you point off into orders of one figure each? C. Because each order is expressed by a single digit. T. In reading 4365476, do you point off into periods — 4,365,477? C. Yes T. Why? C. Because it assists the eye in discovering where eac period ends. T. Why do you point off into periods of three figures each? C. Because each period, except the one at the left, expressed by three digits.

Lesson VII. The children should discover that there are nu bers which are incapable of definite expression.

T. Could you write a number of a thousand digits? C. Ye T. Would that express the number of seconds in eternity? C. N T. Can you write a number that will express how many secon there are in eternity? C. No. T. Can you write a number th will express how many cubic inches there are in space? C. N T. Is the number of seconds in eternity the same as the number cubic inches in space? C. We do not know. T. Each of the numbers whether the same or not is called infinity and is expresse by the same symbol, ∞. Write the symbol for the number of se onds in eternity. C. ∞. T. Write the symbol for the number cubic inches in space. C. ∞. T. Can this symbol stand for a other number? C. Yes, for every number that is incapable definite expression. T. What does infinity mean? C. That whi cannot be bounded.

NOTATION AND NUMERATION—THIRD YEAR.

The course of study for Manhattan and the Bronx divides the third number space into the sub-spaces: 999 to 9999 (2B); 9,999 to 99,999 (3A); 99,999 to 999,999 (3B); 999,999 to 9,999,999 (4A). The plan of teaching notation and numeration for each grade is the same as already indicated. Following are lessons for the 3A grade:

Lesson I. T. Count from 99,997. C. 99 thou 997, 99 thou 998, 99 thou 999, 100 thou, 100 thou 1. T. What is the largest number that begins with 100 thou? C. 100 thou 999. T. Count from 100 thou. C. 100 thou 1, 100 thou 2, 100 thou 3. T. Count 997 thousand by thousands. C. 997 thou, 998 thou, 999 thou. T, Count from 999 thou 997. C. 999 thou 997, 999 thou 998, 999 thou 999.

Lesson II. T. Write the numbers from 1 thousand representing thousand by thou. C. 1 thou 1, 1 thou 2, 1 thou 3. T. Write 993,462. C. 993 thou 462.

Lesson III. The presentation given in the former lesson of this number must be modified because the child has not advanced far enough to grasp the period idea.

T. Write 576,374. C. 576 thou 374. T. If you omit thousand how must you mark its place? C. By the use of a comma. T. Write in that way. C. 576,374. T. Write 339,006, spelling thousand. C. 339 thou 6. T. Write, using the comma. C. 339,006. T. Why do you use the two ciphers? C. To hold hundreds' and tens' places.

Note. The use of the comma at the end of thousands has been taught in the 2B grade.

The Teaching of Halves, Thirds, Etc.

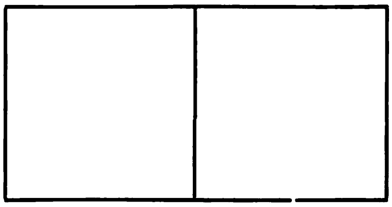
By Lizzie E. Rector, Principal, New York City.

KINDERGARTEN work presents the fraction as an object. The half of four blocks, the third, the fourth, are as truly objects as the original gift itself. In the lower elementary grades, the fraction is one or more of the equal pieces of a thing which is in itself a unit. This work, simple as it appears, furnishes a basis for the consideration of the fraction as ratio.

Many of the so-called difficulties of fractions do not properly pertain to the subject as such, but grow out of the language of fractions, and are greatly enhanced by the fact that we often begin by teaching the language in which they are expressed before we teach the fractions themselves. A fundamental mistake is to take it for granted that the child will see the thing and the relation through the language. The concrete in which the relation may be seen should be presented, and then pupils will perceive without difficulty the relation of fractions through the power they have gained in the study of number. To one who knows four it is easy to teach one-fourth—one of the four equal parts of four. Afterward comes the symbol ¼, a step in the direction of freeing him from sense-limitation. Later it will not be difficult to give another symbol to the ¼, and it becomes 25%.

What may be called incidental work in halves, thirds, etc., is covered in the primary grades, the formal work in fractions begins in the 4-A grade. After conscious direction to the facts that one-half is one of the two equal parts, one-third one of the three equal parts, etc., we are ready to make use of paper and pencil.

Suppose the work is upon halves, then we could begin with a rectangle 2 x 1 divided into two equal parts.



The area of the above rectangle is two square inches. The following questions arise:

One square inch and one square inch are how many square inches?

One half and one half are how many halves?

Two one square inches are how many square inches?

Two one-halves are how many halves?

Two square inches less one square inch are how many square inches?

Two one-halves less one half are how many halves?

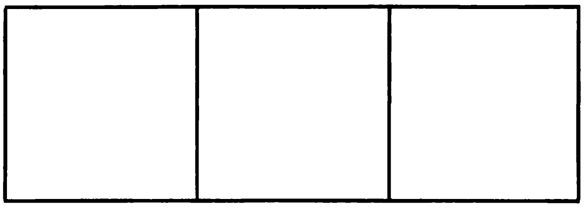
In two square inches there are how many one square inches?

In two halves there are how many one-halves?

One-half of two square inches are how many square inches?

One-half of two halves are how many halves?

In a similar manner we may deal with thirds:



The area of the above diagram is three square inches; then:

Two square inches and one square inch are how many square inches?

Two thirds and one third are how many thirds?

Three one square inches are how many square inches?

Three one-thirds are how many thirds?

Three square inches less one square inch are how many square inches?

Three thirds less one third are how many thirds?

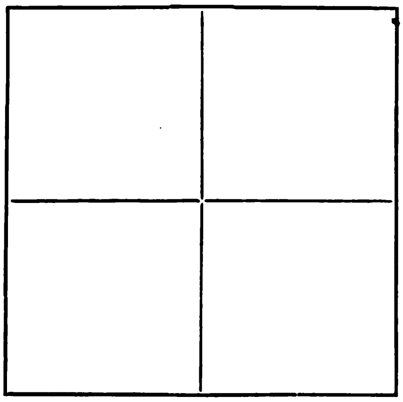
In three square inches there are how many one square inches?

In three thirds there are how many one thirds?

One-third of three square inches are how many square inches?

One-third of three thirds are how many thirds?

The square is useful in teaching fourths.



The area of the diagram is four square inches. We may compare either three inches with four inches or two inches with four inches. Suppose it is the latter.

Two square inches and two square inches are how many square inches?

Two fourths and two fourths are how many fourths?

Two two square inches are how many square inches?

Two two-fourths are how many fourths?

Four square inches less two square inches are how many square inches?

Four fourths less two fourths are how many fourths?

In four square inches there are how many two square inches?

In four fourths there are how many two fourths?

One-half of four square inches are how many square inches?

Two-fourths of four fourths are how many fourths?

The five operations indicated are fundamental, and should be expressed with the proper figures and signs as soon as the relations are clearly apprehended.

By teaching fractions in this way, the following advantages are secured:

First, the new subject, fractions, is presented in such a manner that its relation to the older subject, whole numbers, is shown, and the old is used to interpret the new.

Second, emphasis is placed upon the parts of a thing instead of upon the meaningless symbol. Fractions are taught as a means of thought development.

Third, not only is the pupil getting clear ideas of number and fractions, but he is using a method which later he may classify and use as a working basis for percentage.

The following problems may be suggestive. The questions are to be answered by observing the diagrams.

In a surface three inches long and one inch wide, how many square inches?

What is the distance around a figure three inches by one inch?

One square inch is what part of three square inches?

Two square inches are what part of three square inches?

One-half of two-thirds of three square inches is what part of three square inches?

Two-thirds of three-fourths of four square inches is what part of four square inches?

In order that pupils may get a glimpse of the universality of the principles which they are using, a great number of practical problems, like the following, may be given and the children encouraged to make problems for themselves. As in all work in arithmetic these problems should be closely related to life and its interests Such work is not only more interesting but also more educative.

If one-half of two-thirds of a yard of cloth cost ninety cents what will the whole yard cost?

If a peach cost one-third of a cent, how many can you buy for one-half of four cents?

If ten cents is one-third the cost of a book, what does the book cost?

Three-fourths of a banner pole is in the air, four feet are in the ground; how long is the pole?

A third of an hour is how many minutes?

If a gallon of molasses cost 49 cents, what will a quart cost?

If you sleep eight hours every day, what part of the day do you sleep?

A bushel of oats weighs thirty-two pounds; how many pounds of oats in one peck?

A gardener had two dozen cabbages; after selling a half dozen, how many cabbages had he left?

If Mary has forty-eight cherries, and Emma has one-fourth as many, how many has Emma?

A mother divided one-half a pie between two children; each child received how much?

If a pint of water weighs a pound, what will a gill weigh?

James earned some money; he spent one third of what he earned and had ten cents left; how much did he earn?

Clara's father is thirty-two years old; how old is Clara if she is one-fourth as old as her father?

One half and one fourth of a foot are how many inches?

If a yard of lace cost 48 cents, nine inches will cost how much?

The cyclometer on Henry's wheel reads thirty-six miles; Willie's reads only one-half as much; how many miles did Willie ride?

Jennie had a piece of ribbon one-third of a yard long, Carrie had a piece one-fourth of a yard long; together they had how much?

Carrying of Tens in Addition.

By HARRIET H. KEITH, Instructor of Methods, New York City.

THE difficulties of "carrying" vanish altogether with a thorough comprehension of the order and value of numbers as expressed in the decimal notation. We are all sorrowfully familiar with the possible and impossible mistakes. There are the children who carry the wrong figure; and those who refuse to carry at all; and those who crowd into the answer every figure of the partial sums; and those who leave out all the noughts; and those who write down anything, regardless of rhyme or reason; to say nothing of those who follow the rhyme without the reason and deceive themselves and the teacher with the right answer. If such children be asked to name the number that is one more than three hundred and ninety-five, for example, they are likely to make some wild guess. It is useless to attempt to teach carrying until the decimal system of notation has become a natural language of number to the children. To accomplish this, the less fuss and form that is used in teaching it, the better. The following is a device that has been tested, and has yielded excellent results. Being in the nature of a guessing game, it excites interest at once, and requiring alertness on the part of the children while waiting for "turns", it sustains a very lively interest through what might seem to the uninitiated too simple a game.

For a few cents a box containing over a thousand small sticks or tooth-picks may be procured, and the children asked to guess how many in the box. The teacher may write their "guesses" on the blackboard or on a chart to be preserved for future reference with the initials of the child giving the guess; but this is not a necessary part of the game, and should not consume too much time. Only a few representative guesses need be recorded, the other children taking sides. And now comes the counting when the real gam begins. A child is selected to take the teacher's place, and pick u the small sticks one at a time to be counted aloud by any chil whom she selects from the class. The "little teacher" should ca upon different children frequently, and it should be made a distin part of the game to be ready to go on with the counting whenever and wherever called upon; and as children do not like to be caught napping by their classmates, a lively attention is secured. As soon as ten sticks are counted out, they should be done up in a bundle (a box of small rubber elastics should be procured for this) and handed over to another child who is to stand at the teacher's desk to the left of the child handling the units and conducting the counting. This second child has the duty of taking charge of the "tens" as they are handed over to her. When she has accumulated ten tens, they in turn may be done up in a bundle and handed over to a third child who occupies a third place at the desk and takes charge of "hundreds." Her active duties though few and far between are attended with a certain dignity and bulkiness that prevent the office from being a sinecure, and make it a center of a growing excitement as each hundred nears completion.

A few minutes only each day should be spent in this counting, when the number attained should be written on the blackboard, each one of the three children at the desk writing her own figure in its proper place. Next day, the number on the board should be consulted so that the counting may be resumed from that point, while giving children the additional practice of interpreting the figures. The teacher, of course, takes pains some days to stop the counting at numbers where noughts are needed, or those containing "teens," as 213, 270, 309, 400, etc.; although for the first few days noughts should be avoided as the children would not see the necessity for writing them. The use of the nought makes the children realize all the more that the meaning of the figure depends upon the place it stands in. But there should be no lengthy explanations, the object being that the children should take this mode of writing the number as a matter of course, and as a mere record incidental to the game. This record all the children might write in little note-books kept for the purpose. The terms, unit's place, ten's place, hundred's place, may be used freely from the start, the children associating them with the position of the children holding the sticks.

No test exercises in writing numbers should be given to the children at first as the children might become confused. After a few days, however, they may write on paper in a column all the numbers counted that day. (Insist on columns being kept vertical, using edge of paper as a guide, and a wide space left between figures.)

The practice of arranging the numbers in separate columns of ten in a column has the disadvantage that it often leads children to change the figures in a mechanical routine and lose sight of the value of individual numbers as wholes. Also a change like that from 139 to 140 appears like a bigger jump than that from 138 to 139, when one number ends and the other begins a new column. The fact of the grouping by tens had better be impressed on the children in a more concrete way.

The children should be taught also to add *ten* or *one hundred* at sight to any number given them. It will be found that the children can do this very readily after the counting has proceeded for several days, and are pleased to see that the written number helps them to do this as it tells how many tens and how many hundreds there are in the number.

Now the wise teacher will here forestall a difficulty in the carrying of tens even though it may not be in her grade's work. Not only can the children see that the figures tell them how many free tens there are in the number, but also how many tens altogether. The children can compute this directly from the bundles of sticks. Suppose the number in hand to be two hundred and forty-one. "How many tens done up in the hundreds' bundles?" "How many tens altogether?" "Yes, twenty-four." "Do you see anything in the written number to tell you there are twenty-four tens?" Children may underline the number thus: $\underline{24}1$. Ask this question for several successive days, incidentally, concerning the number of sticks counted. When the children have thus thoroughly associated the concrete fact with the abstract representation, discard the concrete aid, and, writing any number on the blackboard, ask children to tell directly how many tens altogether in it, underlining the figures that tell, as: $\underline{12}5$, $\underline{23}0$, $\underline{40}5$, etc. A brief verbal form always assists abstract thinking, as *twelve* tens give *one* hundred and *two* tens. *Twenty-three* tens give *two* hundreds and *three* tens. This is the fundamental idea in the carrying of tens. It is best that the children should learn it while they are learning to write the numbers so that they may look upon it as an essential idea in the make-up of the number and not as an afterthought, especially devised as an excuse for carrying.

Subtraction Where One or More Zeros are Involved in the Minuend.

By Richard Keller Piez, Oswego, State Normal School New York.

PLAN FOR THE TREATMENT OF A METHOD-WHOLE.

IT is impossible to plan and elaborate any single lesson in any subject of study without due regard to the instruction which has preceded and which is to follow it. A method-whole, roperly considered, must necessarily contain more matter than can e presented during a recitation period of the customary duration. n order that the individual lesson may perform its purpose it must e considered in its relation to the entire method-whole. In the ollowing plan, the instruction which should precede and follow the articular lesson—"Subtraction, when one or more zeros appear in he minuend"—is briefly outlined, while the particular lesson is reated more fully.

In order that the pupil may learn to understand a new process n arithmetic and acquire power to use it, he must be led to (1) reroduce such of the knowledge of number relations and arithmetical rocesses which he has already acquired, as will enable him to aperceive the new process; (2) he must learn the different steps in he process, one at a time in the order of their difficulty; (3) he ust be led to formulate a rule for performing the process*; (4) he ust acquire facility in the use of this rule by applying it to as any concrete problems as possible. Since each preceding step ust be fully mastered before it is possible for the pupil to grasp he next, it may be necessary for the teacher to distribute the drill hroughout the lessons, introducing it at the end of each step, intead of postponing it until the end of the method-whole is reached.

The method pursued in the study of the method-whole is thus nductive-deductive; from the particular to the general and from he general back again to the particular. This does not necessarily mply that the pupil is to begin with the subtraction of concrete things from a group of the same things, but means that he is to begin with the analytic study of a number of particular problems dealing with subtraction. Nor does it mean that the pupil must study a number of particular problems before he begins to generalize, for the truth perceived in dealing with any one problem of subtraction is applicable to all. If the teacher plans a number of problems to be analyzed and studies consecutively it should be to direct the pupil's attention first to one step in the process and then to another. *

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* It is of less importance to the pupil that he formulate this rule in words than it is or him to learn to use it automatically.

1 *Notation.* The relative values assigned to numbers by virtue of their position with regard to other numbers.

PREPARATION. The work indicated under this heading may have been already done in previous lessons and may therefore be omitted. A brief review is, however, desirable in order that the already-known is reproduced for the apperception of the new process.

Thus, 485 equals 400+80+5, or 485 consists of 4 hundreds, 8 tens, and 5 units.

2. Units can only be subtracted from units, tens from tens, hundreds from hundreds, etc.

3. The meaning of terms and signs, minuend, subtrahend, remainder, difference, etc.

LESSON I. Subtract 25 from 87.

Analysis. 25 *i. e.*, 2 tens and 5 units are to be subtracted from 87, *i. e.*, 8 tens and 7 units. The problem may be written like this:

87 which means that 25 is to be subtracted from 87.
25

If 5 units are subtracted from 7 units 2 units remain. This remainder is written in the units column, below the horizontal line which indicates that the subtraction is to be performed. If 2 tens are subtracted from 8 tens 6 tens remain. This remainder is written in the tens column below the horizontal line.

If 2 tens and 5 units are subtracted from 8 tens and 7 units respectively, 6 tens and 2 units remain. 6 tens and 2 units equal 72.

Synthesis. May consist in a verbal account of the process, rendered by the pupil, or a summary of the process. †

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* Some teachers permit the pupil to study a large number of problems before proceeding to the formulation of the rule. If this is for the purpose of making the child more familiar with the process before describing it in words no serious objection can be raised to the practice.

† To subtract one number from another, write the subtrahend under the minuend placing units under units, tens under tens, hundreds under hundreds, etc.

Subtract the units in the subtrahend from the units in the minuend and write the remainder in the units column under the horizontal line, etc.

Application. Working of additional problems in which the units, tens, hundreds, etc., of the subtrahend are less than the units, tens, hundreds, etc., of the minuend respectively.

LESSON II. Subtract 28 from 90.

Analysis. Teacher directs pupils to write problems in proper form.

Tr. How many tens and units in 90? P. 9 tens and 0 units. Tr. How many tens and units in 28? P. 2 tens and 8 units. Tr. From what must 8 units be substracted? P. From the number of units in 90, *i. e.*, 0 units. Tr. Can this be done? P. No. Tr. What can we do? *

We may take one of the tens in 90 and convert it into units, in which case 90 will consist of 8 tens and ten units. We will now restate our problem in subtraction, thus:

P. From 8 tens and ten units subtract 2 units and 8 tens.

$\left.\begin{array}{r}90\\ \underline{28}\end{array}\right\}$ would now be stated thus: $\begin{array}{r}8 \text{ tens} + 10 \text{ units}\\ \underline{2 \text{ tens} + \ \ 8 \text{ units}}\end{array}$

Tr. There is a similar way of stating this in writing, which saves rewriting the entire problem. If a small 1 is placed in front of, and slightly above the 0 in 90 (thus $9^{1}0$) it may mean that the 0 units have been increased by the addition of ten while the 9 tens have been reduced by the subtraction of 1 ten. We will now subtract. (Proceed now as in lesson 2.)

P. 8 units taken from 10 units leave 2 units; 2 tens taken from 8 tens leave 6 tens; or, 28 taken from 90 leaves 62.

Synthesis. Summary made by pupils under guidance of teacher. This summary may include the one of the previous lesson or may collect only the newly learned. When the number of units in the minuend is 0 and the number of units in the subtrahend is greater, take one of the tens of the minuend and add 10 units to the 0 units.

Application. Problems in subtraction dealing with numbers similar to the one used in the lesson.

LESSON III. Subtract 187 from 209.

Develop as the preceding, dealing with relative values of tens and hundreds instead of units and tens.

LESSON IV. From 400 subtract 163.

Developed similar to Lesson II. the child being directed to resolve 400 into

400=4 hundreds 0 tens 0 units, or
400=3 “ 10 “ 0 “ or
400=3 “ 9 “ 10 “

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*If the pupil cannot suggest what ought to be done, the teacher can tell directly without further questioning.

Restated the problem will thus be: From 3 hundreds, 9 tens and ten units subtract 1 hundred, 6 tens and three units.

Lesson V. From 973 subtract 524.

Developed like the preceding lessons.

Lesson VI. From 524 subtract 196.

Developed like the preceding lessons.

If the pupils have sufficient knowledge of the system of notation the problems may be extended to numbers greater than those used in the illustrations.

After these or a number of similar lessons have been given another lesson may be devoted to the comparison of the different examples and to the formulation of a rule generally applicable to subtraction.

The drill with miscellaneous problems should be extended until the pupils have acquired a reasonable amount of facility in performing the process of subtraction.

Subtraction With Borrowing.

By Wilbur F. Nichols, Supervising Principal, New Haven, Conn.

WHILE the subject of this article is usually described under the above title a better caption would be: *Subtraction, when Terms in the Subtrahend are Greater than Corresponding Terms in the Minuend.* While not so brief, this title is better because it is more accurate. In mathematics all terms should be used with the greatest care, and therefore we should never use the word borrow in connection with subtraction. We do not borrow what we have no intention of returning, we simply take it. This use of the word doubtless originated from the "old method" of subtraction, where we are told to add one to the minuend because we have borrowed one from the subtrahend. This method is based upon the principle that, "if two numbers be equally increased their difference will remain the same." I confess that as a child I never understood why I should pay back to the subtrahend what I had borrowed from the minuend. Many excellent teachers and educators use this method. Prof. Dewey says in Psychology of Number, "This process is not a direct solution of the problem but it is one that can be made quite intelligible." This may be possibly true with a class of adults, but I have never found it to be true with little children, though I have often found them very proficient in the process.

There is another method of teaching subtraction, which has many loyal advocates. This method is based on the fact that the sum of the remainder and subtrahend is equal to the minuend. If we wish, for example, to find the difference between 25 and 18, we find what number added to 18 will make 25.

While excellent results are obtained by using either of these two methods, the best method, in my opinion, is "the changed-minuend" method. This consists in so changing the form of the minuend without changing its value that each of its terms shall equal or exceed the corresponding term of the subtrahend. Hence before pupils are ready for this step we must give them much practice in examples like the following: $\begin{array}{r}468\\ \underline{245}\end{array}$ $\begin{array}{r}729\\ \underline{416}\end{array}$. This is the simplest form of subtraction, where each term of the minuend equals or exceeds the corresponding term of the subtrahend. It will not be time wasted to give a large number of examples of this class, ignoring the fact that in life problems in subtraction rarely present this form.

Another point must be made clear before the pupil is ready for the advanced work in subtraction, that is the idea of units, tens and hundreds. It is here that nine-tenths of the poor work in arithmetic begins and that pupils lose all correct ideas of number and begin to use figures in a mechanical way according to rule. It has always seemed to me that too much stress was placed upon mechanical processes and too little upon the equally important aim of the development of thought-power. I do not want to be misunderstood and have anyone think that I advocate inaccurate work in the four fundametal processes. Accuracy must be secured. To secure it we must drill, drill, drill. I would have drill, but a drill that is not wholly mechanical.

But to return to the point from which I have digressed, a child will not get the correct idea of twenty-five for instance by writing 25 on the board and telling him that the 2 means two tens. Rather give him 25 splints and tell him to count out ten and tie them together, and then count another ten and tie them together. Question him then till he sees why the 2 means two tens. I grant that in the best schools the subject of number is taught in an intelligent and illustrative manner, but in a part of our schools this is not the case, but "figuring" is the all-important thing.

If this preliminary work has been well done the pupils are now ready for "Subtraction with Borrowing." Give each child, for example, 32 splints, three tens and two units, and ask him to take away 18 splints. Do not tell what to do but lead the children toward the point through simple questions How many units have you? Can you take away 8 if you have only 2? Where can you get more units? Questions of this nature should be continued until some pupil suggests that we untie one ten. Following the suggestion, continue questions. How many units in one ten? Now how many units have you? How many tens? This is the way we will write it:

$$\begin{array}{cc} 2 & 12 \\ \cancel{3} & \cancel{2} \\ \hline 1 & 8 \end{array}$$

If you take 8 units from 12 units, how many units will be left? Take one ten from two tens, how many tens are left? The work finally appears:

$$\begin{array}{cc} 2 & 12 \\ \cancel{3} & \cancel{2} \\ 1 & 8 \\ \hline 1 & 4 \end{array}$$

Let the children perform the work, step by step, with the splints and make the changes in the minuend to illustrate each step of the work. The pupils should be compelled to use the splints in solving every example in subtraction until they thoroughly understand the principle; then they should not use the splints or change the form of the minuend, but perform the operation mentally and write only the answers.

At this stage in arithmetic the old motto, "Make haste slowly" should be ever in mind. Do not give numbers containing hundreds till units and tens are fully mastered. When hundreds are presented for the first time, use the splints again for the first few lessons.

In the third year of school where this subject is first taught, no numbers higher than hundreds should be given. It is absurd to give to pupils of seven or eight years of age examples like this:

$$\begin{array}{r} 7163471 \\ \underline{2848593} \end{array}$$

This is often done on the ground that children *can* do them and that such examples give good practice in the mechanical process of subtraction. On the same ground all the absurd fads in the world might be taught. The question should not be, "Can the children do it?" but, "Is it reasonable to demand it of them?" "Could not the time spent on this work be more profitably spent on something else?"

When the subject of subtraction is illustrated with the splints and taught with numbers within the children's comprehension, I believe we shall find our pupils neither dull nor slow of understanding, but quick to grasp new ideas and growing stronger and stronger every day in mental power.

The Teaching of Hour, Minute, Day, Etc.

By DANIEL T. EDWARDS, Instructor, Brooklyn, N. Y.

TO begin his development of the time problem the child should be provided with cardboard, scissors, pencil, ruler, protractor, and dividers. With a radius equal to that of the semi-circle made by his protractor, let the child describe a circle. Then let him draw (lightly) a vertical and a horizontal diameter. He is then directed to mark one point of intersection with the Roman numeral XII. Now he compares the dial which he has begun with that of the schoolroom clock. He sees that the opposite extremity of the vertical diameter must be marked VI. While the right and left extremities of the horizontal diameter must respectively be marked III and IX.

In the further development of his clock dial he is thrown back upon fundamental number relations. By the use of his protractor he finds that each quadrant in the circle must contain 90°. Then he is led to determine the relative positions of I and II in the first quadrant. From observation of the schoolroom clock he concludes that the quadrant must be divided into three equal parts. By super-position of the protractor he finds that the first third of the quadrant marks off 30°, and the second third 60°. Here he places I and II respectively. In like manner he completes his dial. Then by means of a pin through the center he places a minute hand on the dial, and makes it point directly to XII. He is told that every time that the minute hand of the schoolroom clock makes a complete revolution an hour has elapsed. He then causes the hand of his dial to make complete revolutions, measuring off so many hours. He soon discovers, however, that he needs something to tell him which hour is marked off. He is told that the hour hand of the schoolroom clock indicates each hour upon its completion. So he equips his dial with an hour hand. Then he sets his clock at the time for school to open, for recess, for dismissal, etc. In this way he acquires facility in indicating any required hour.

He has already discovered that the equal intervals on the schoolroom clock between the numerals are sub-divided into equal spaces. This division he next attempts upon his own dial. He notices after an application of his protractor to the interval in question that it measures 30°. This space is to be divided into five equal parts, thus allowing 6° to each subdivision. He is told to call these subdivisions minute spaces. Now he can set his clock at any desired minute past or before a given hour, not being limited to five minute periods or multiples thereof.

He will now see that since each larger interval contains five smaller divisions called minute spaces, and since there are twelve of these larger intervals, it is necessary that the minute hand travel over 60 minute spaces in making a complete revolution, or in the course of an hour's time. Thus he has arrived at an item which later on must enter into his table, for he has reached the conclusion that 60 minutes make an hour.

The child will notice that each of the minute spaces is capable of subdivision, for it takes the minute hand an easily appreciable time to traverse one. He then attempts to discover some process that may take place in a minute. He counts the ticks of the clock, or the beats of his pulse, or his respirations as timed by the schoolroom clock. He is told that it has seemed best to make only 60 subdivisions in a minute, and to call them seconds. This division provides such short intervals that shorter ones are difficult of discrimination, and so not usually made. Again the child has secured an item for his table. For he finds out that a minute is composed of 60 seconds.

Up to this time the pupil has been following more or less closely the construction and manipulation of a concrete tangible device by means of which he has been enabled to form adequate ideas of the measurement of an ideal entity. In doing this he has made free use of his mechanical ingenuity – an exercise that almost always delights pupils of his age. But he has dwelt long enough amid such grossly concrete surroundings. He must rely upon them less and less in the future, and must seek from his social and industrial environment those phenomena that will assist in making further progress in the solution of the time problem, recurring where necessary to his device for illustration and verification.

He should now be talked to and questioned upon his idea of the meaning of the term "day." Attention will be called to the different kinds of days: the school-day, the factory-day, the day of the agricultural laborer, of the shop-girl, of the mechanic, etc. Thus it will appear that the length of the day measured for purposes of industry is not constant. Now he is asked to perform some such operation as to discover the number of days from or until his next birthday, Christmas, or some holiday. He will possibly require some necessary data. If so it should, of course, be supplied. He should then be asked what kind of days he has found: school-days, working-days, days while the sun is shining, etc. It will not be difficult for him soon to discover that such variable measurements are inadequate for all purposes: that for the calculation of his age he must employ a day (which may be taken as typical of days on the civil calendar) that comprises every minute of time in both day and night, so called, both while he is awake and while he is asleep. Then he searches for such an all-inclusive day. After appropriate questioning and discussion he reaches the conclusion that a day consists of that part of duration elapsing from a certain point in time marked by one of a series of rhythmic occurrences to its second appearance in the series. He is told that the schoolroom clock will mark off exactly 24 hours during such a period of time. He knows that his dial will mark off 12 hours, and will see that the hour hand must indicate the elapse of two consecutive periods of such length during a complete day. He is informed that people have agreed to reckon this complete-day period from one midnight until the following one. This time evidently includes days of any length: summer days, winter days, etc. After fixing this process and its meaning in memory it will soon appear that he can make complete days by two revolutions from any given point on his dial. So he has another item for his table: 24 hours make a day.

Here is a place for interrelation between geography and arithmetic; between time as measured by natural processes, thus affecting the life and activities of man, and the established device for measuring it off mechanically to meet the demands of social organization. The revolution of the earth causing the rising and setting of the sun gives the idea of a complete cycle, from which time measurement results. But the earth has another motion. It rotates about the sun, completing the circuit in about 365¼ days. We call the time 365 days, and allow the extra fourth of a day to "accumulate" until at the expiration of 4 years it has made another day. This gives every 4th year 366 days, or one day more than is possessed by a common year. Here we have a leap year. The child should now be led to see that from his birthday, Christmas and the like, until the return of the same event completes a year. He should now familiarize himself with finding the year from any date till another. He learns that the calendar year begins with Jan. 1st, but that he can estimate years beginning with any date. Now he has another item for his table: 365 days make a common year, and 366 days make a leap year.

The year is too big a division of time to be of service in most contingencies of practical life. The rent, gas, and grocer's bills must be attended to at more frequent intervals. So a division into shorter periods is necessary. Such periods are called weeks and months. The year, he is told, is divided into 12 parts, and each part is called a month. He now endeavors to find out whether he can divide his year of 365 days into 12 equal parts so as to give each month the same number of days. Being unable to do so he is informed that all months are not of the same duration. The names of the months are given with the number of days in each. He is told to which month to add once every 4 years the "surplus day" previously dealt with. It will scarcely be necessary to devote more than passing attention to the fact that a week consists of 7 days. Since this is probably a matter of "common learning" to him, interwoven as it is into the whole fabric of his social environment.

After this stage has been reached it will be an easy matter to get the child to recognize that, just as 100 cents make a dollar, so 100 years make a century. This will be facilitated in the present instance by the widespread interest attendant upon the celebrations consequent upon the closing of the century just passed.

In this way the child has by his own processes, under judicious direction, built up for himself a "time table." Memorizing it then will become a matter of minor difficulty. But it should be fixed in his memory in a logical order, so as to be always "at his tongue's end," and usable. Then it is his to apply deductively the knowledge he has thus arrived at. Numerous suitable exercises must be provided by which he may, by the help of previously acquired mathematical principles, apply the specific measurements as contained in his table.

Factors, Divisors, and Multiples.

By Edward Brooks, Superintendent of Schools, Philadelphia, Pa.

Teacher. What numbers multiplied together will *make* 6? Pupils. 2 and 3.

T. What numbers multiplied together *make* 12? P. 3 and 4.

T. Since 2 and 3 multiplied together *make* 6, what may 2 and 3 be called of 6? P. the *makers* of 6.

T. Yes, they may be called the *makers* of 6. Now, if the word factor, which means the same as *maker* is used, what may 2 and 3 be called of 6? P. The *factor* of 6.

T. Yes; name the *factors* of 10; the *factors* of 12; the *factors* of 15.

T. Of what two numbers is 6 *composed?* P. Of 3 and 2.

T. Since 6 is *composed* of 3 and 2, what kind of a number may we call 6? P. A *composed* number.

T. Yes; or a *composite* number. What then is a *composite* number? What kind of a number is 8, 9, 10, 12, 13, 14, etc.? What are the factors of each of these numbers?

T. Name some numbers that are not composite numbers. What shall we call the numbers that are not composite numbers? P. We do not know.

T. I will tell you; they are called *prime numbers.* What then is a prime number? Name some prime numbers, etc.

T. What *divisor* is *common* to 4 and 6? To 6 and 9? To 8 and 12? What may we call a *divisor* that is *common* to two or more numbers? P. A *common divisor.*

T. Yes, that is right. What is the common divisor of 10 and 15? Of 12 and 18?

T. What is the *largest* divisor common to 8 and 12? To 10 and 20? To 20 and 30?

T. What would it be proper to call the *largest* divisor common to two or more numbers? P. The *largest common divisor.*

T. Yes, that is correct; or we may call it the *greatest common divisor.* What then is the greatest common divisor of two numbers? What is the greatest common divisor of 8 and 12? Of 10 and 20? Of 16 and 21?

T. 12 is *how many* times 4? 12 is *how many* times 6? 20 is *how many* times 5?

T. When one number is a "number of times" another number we call it a *multiple* of that number; what number then is a multiple of 4? Of 6? Of 8?

T. What then is a *multiple* of a number? P. A *multiple of a number* is a number which is a number of times that number.

T. What multiple is *common* to 4 and 5? To 4 and 6? To 8 and 12? What may we call a multiple *common* to two or more numbers? P. A *common* multiple of those numbers.

T. Yes, it is called a *common multiple*. What is a *common multiple* of 5 and 6? Of 6 and 9? Of 8 and 12?

T. What is the *least* multiple common to 4 and 6? To 6 and 8? To 8 and 12? What may we call the *least* multiple common to two or more numbers? P. The *least multiple common*, or the *least common multiple.*

T. Yes, it is called the *least common multiple*. What is the least common multiple of 6 and 8? Of 8 and 12? Of 10 and 15?

The Multiplication of Tens.

By Ida B. Lindheimer, Principal, New York City.

PREPARATION.

THE teacher calls five children to the front of the room, gives to each one 9 pencils and asks the class how many pencils were given to the five children. (45) She asks John how he obtained his answer. John: "9 pencils and 9 pencils are 18 pencils, and 9 pencils are 27 pencils, and 9 pencils are 36 pencils, and 9 pencils are 45 pencils," or perhaps—"I added 9, 18, 27, 36, 45." Teacher asks whether any one obtained the same answer in a different manner. Wm. "I said 5 times 9 pencils are 45 pencils," or "9 pencils taken 5 times are 45 pencils." Teacher asks the class which is the shorter method;—What is gained by this method?—Time for what? "For more work or for play?" Teacher asks John to place his work on B. B.; asks William to do likewise; asks the children to examine the work on the B. B. and see that something besides time is saved by William's method. What?

$$\begin{array}{rr} \text{John's} & \text{Wm.'s} \\ 9 & 9\times \\ 9 & \underline{5} \\ 9 & 45 \\ 9 & \\ \underline{9} & \\ 45 & \end{array}$$

The teacher places on blackboard four columns of 3's; tells the children she does not wish them to add; but wishes to know how many 3's there are and what all the 3's would come to. Ans. 60 or 6 tens. Asks Frank how he obtained his answer. Frank: "Ten times 3 units are 3 tens, and 20 times 3 units are twice as much as 6 tens." Frank is asked to go to the B. B. and show the groups of 10.

$$\begin{array}{cccc} 3 & 3 & 3 & 3 \\ 3 & 3 & 3 & 3 \\ 3 & 3 & 3 & 3 \\ 3 & 3 & 3 & 3 \\ 3 & 3 & 3 & 3 \end{array}$$

$$\underbrace{\begin{array}{cc} 3 & 3 \\ 3 & 3 \\ 3 & 3 \\ 3 & 3 \\ 3 & 3 \end{array}} \qquad \underbrace{\begin{array}{cc} 3 & 3 \\ 3 & 3 \\ 3 & 3 \\ 3 & 3 \\ 3 & 3 \end{array}}$$

PRESENTATION.

New Material. Points to be developed: the necessity of partial products, and the manner in which the multiplier is to be analyzed for the purpose of obtaining these partial products.

Teacher places on blackboard
to represent 17 times 3 marbles: ∴ ∴ ∴ ∴
Also 3 3 3 3 ∴ ∴ ∴ ∴
3 3 3 3 ∴ ∴ ∴
3 3 3 3 ∴ ∴ ∴
3 3 3 ∴ ∴ ∴
3 3

Teacher asks the class—"How many times 3 marbles have we?"

"What is 17 times 3?" Does the table of "3 times help you?" "No." "Can you divide these seventeen 3's into groups of ten, as you did the twenty 3's?" "No, it is more than one group of ten, but not enough to make two groups of ten." (It is possible that some bright children will now see the method; but we will suppose that no one can find a way of telling what 17 times 3 is.)

Teacher tells Thomas to go to the B. B. and draw a line marking off a group of ten 3's from the seventeen 3's.

∴ ∴ ∴ ∴ 3 3 3 3
∴ ∴ ∴ ∴ 3 3 3 3
∴ ∴ ∴ 3 3 3 3
∴ ∴ ∴ 3 3 3
∴ ∴ ∴ 3 3
︸ ︸

Teacher—"Let us see whether this will help us?" (Let us suppose that no one is yet able to find the method, although this is hardly likely to be the case.) Tr. "When we have marked off the ten 3's, how many 3's are left?" Ans. "Seven 3's." Tr. "How much are seven 3's?" Ans. "21." "How much are the ten 3's?" Ans. "30." Tr. "Now, who can tell me how much 17 times 3 are?" A number will be able to give the answer, 51. Tr. "What is 51?" Ans. "The answer." Tr. "What do you call an answer obtained by multiplying one number by another?" Ans. "A product." Tr. "What is 51 the product of?" Ans. "17 times 3." Tr. "What was 21 the product of?" Ans. "7 times 3." Tr. "What other product did we find in this example?" Ans. "30, which was the product of 10 and 3." Tr. "Which was the product called for?" "51." Tr. "Why did you not say that 21 was the product I asked for?" "You asked for 17 times 3, and 21 is only 7 times 3." Tr. "That is right. Who can tell it in other words?" Ans. "21 is the product of only a part, not of the whole of 17 times 3." Tr. "Then we will call 21 a 'part product,' or better still, a partial product." (Teacher places the words "partial product" on B. B.) "How many partial products did we find in this example?" "Two." Tr. "Name them." "21 and 30." "How did we find the entire product?" "By adding the partial products 21 and 30." The teacher now places on blackboard:

$$\begin{array}{l} 3\times \\ \underline{17} \\ 21=3\times 7 \\ \underline{3\ \ =3+10} \\ 51=3+17 \end{array}$$

and calls attention to the necessity of placing units under units, tens under tens, etc., "In this example what did we find first?" "7 times 3." "What was the product of 7 times 3?" Ans. "21 or 2 tens and 1 unit." "Where shall I place the 1 unit?" "Under units." "Where write the 2 tens?" "Under tens." "What was 21?" "The product of 7 times 3." "We will write that." "Is 21 a product?" "Yes." "Is it the entire product we are looking for?" "No." "Of what was it the product?" "What shall I call it?" "A partial product." "What have we still to find?" "10 times 3." "What is 10 times 3 units?" "3 tens." "Where place the 3 tens?" "Under the tens." "What is 3 tens?" "The product of 10 times 3 units." Tr. "Let us put that down." "What have we found thus far?" Ans. "Two partial products," or "The product of 7 and 3, and the product of 10 and 3." "How shall we find the entire product?" "Add the partial products." "Could I add units to tens, or tens to hundreds?" "Have I been careful to place tens under tens?" etc. "Let us add." "What is the entire product?" "51." "What is 51 the product of?" "3×17."

"Do you think you could do more difficult examples?" "Would you like to try?" (There is always one answer.) The teacher places on the B. B.

$$\begin{array}{l} 48\times \\ \underline{19} \end{array}$$

and asks the children whether they would try to find the entire product at once, or as in the last example, partial products. Teacher asks what the partial products which they wish to find are. Most of the children will tell her "10 times 48, and 9 times 48." If any difficulty arises here, the 48's may be written upon the B. B. and a child desired to mark off the group of 10, thus showing the 9 left.

$$\begin{array}{l} 48 \\ \underline{19} \\ 432=48\times 9 \\ \underline{48\ \ =48\times 10} \\ 912=48\times 19 \end{array}$$

"What shall we find first?" "48×9." "What is 9 times 8 units?" "72 units, or 7 tens and 2 units." "Where shall we write 2 units?" "Under units." "What do we do with 7 tens?" etc. "What is 9 times 4 tens?" "36 tens." "How many tens have we to carry?" "36 tens+7 tens=43 tens or 4 hundreds and 3 tens." "Where write 3 tens?" etc., etc. "What is 432?" "The product of 48×9." "Is it the entire product we are trying to find?" "What product must we now find?" What is 10 times 8 units?" "8 tens." "Where write 8 tens?" "Under tens." "What is 10 times 4 tens?" "4 hundreds." "Where write 4 hundreds?" etc. "What is 48 tens?" "The product of 48×10." "How many partial products have you found?" "Read them." "How find the entire product?" "Have we written tens under tens, hundreds under hundreds?" "Why is this necessary?" "Add the partial products." "Read the entire product." "What is 912 the product of?" "Let us put it down."

DRILL.

This might consist in answers to the following questions: "How would you find the product of 76×34?" Ans. "Find the product of 76 and 4, and the product of 76 and 30, and add the partial products." "How find 59 times 87?" "Find 9 times 87, and 50 times 87 and add the partial products." etc.

APPLICATION.

This drill is to be followed by an exercise in which as many pupils as possible are sent to the B. B., each there to do an example applying the rule just learned; while those in their seats work a similar example on paper. Those chosen to do the work on the B. B. should be so selected that the remainder of the class, in seats, are so scattered that copying is impossible. (It is well to send the ‘weaker" ones to the B. B. The teacher is thus able to discover wherein their weakness lies, and to give them assistance.) Each pupil at the board will have an example different from that of every other child at the board, and also from that being done on paper by the rest of the class. Sufficient B. B. surface to accommodate a large number of pupils is presupposed.

The Teaching of Multiplication by Numbers of Two Digits.

By EVA F. BUKER, Training School for Teachers, Brooklyn.

BEFORE this lesson is begun pupils should have accurate knowledge of the multiplication tables, and be able to use multipliers of one digit rapidly and correctly.

The numbers 10, 11, 12, should be used as one digit, and in connection with 10 should be taught multiplication by multiples of 10, as 20, 30, 40, and so on, using the short way, that of writing the cipher in units' place in the product and multiplying by the digit which shows how many tens in the multiplier. This work should be well done.

Multiplication by numbers of two digits thus resolves itself into easy explanation.

Teacher puts on the blackboard such an example as 234 multiplied by 23.

$$\begin{array}{r} 234 \\ \underline{23} \end{array} \qquad \begin{array}{l} 23=20+3. \\ \text{Question pupils for this.} \end{array}$$

Since pupils know how to multiply by 3, this part of the work may be readily performed by them, the teacher handling the crayon to facilitate matters and to keep the example on the board in proper shape.

$$\begin{array}{r} 234 \\ \underline{3} \\ 702 \end{array}$$

Question for the part of the multiplier next to be used.

Proceed to multiply by 20.

$$\begin{array}{r} 234 \\ \underline{23} \\ 702 \\ \underline{4680} \\ 5382 \end{array} \qquad \begin{array}{l} 20 \text{ times } 4=80. \\ 80=0 \text{ units, } 8 \text{ tens.} \\ 20 \text{ times } 2 \text{ tens or } 30=600. \\ 600=0 \text{ units, } 0 \text{ tens, } 6 \text{ hundreds.} \\ 20 \text{ times } 200=4000. \end{array}$$

Numerate as above.

After each multiplication above, question for the value of the digit in the product thus obtained and its consequent place in the partial product.

Since the first line, 702, is the product of 234 mutliplied by 3, and the second line 4680 is the product of 234 multiplied by 20, the sum of 702 and 4680 will be the product of 234 multiplied by 23.

Teach partial products, if not known, in connection with 702 and 4680.

Using same example show it in the finished form multiplying by 3 and by 2.

$$\begin{array}{r} 234 \\ \underline{23} \\ 702 \\ \underline{468} \\ 5382 \end{array}$$

Question for the value of the naught and its omission; for the position of the 2 of the first partial product with reference to the 3 which produced it; for the position of the 8 of the second partial product with reference to the 2 which produced it; and for the adding of the partial products to obtain the final product.

Give other examples using always the finished form, and the figure in tens' place of the multiplier, as a single digit, without regard to its value.

Lead the pupils to discover that the first figure of each partial product is placed under the figure of the multiplier which produced it, and the partial products are to be added for a final product.

The result sought is rapid and accurate multiplication by multipliers of two digits, in the best and most practical way for every day, ordinary living, and no unnecessary work on the part of the pupils.

First Steps in Teaching the Multiplication Table.

By P. P. Colgrove, St. Cloud Normal School, Minn.

THE combination of arithmetical symbols known as the multiplication table is very frequently related to a meager content in the mind of the average student even though he may have completed the whole subject of arithmetic by "passing the examinations." If the statement that six times nine equals fifty-four is a product of the pupil's own relating activity, if it expresses a relation which he has discovered among ideas in his own consciousness, then it implies the previous formation of a number of particular judgments which have grown out of concrete experiences. When this is not the case, the learning of the multiplication table is a mere memory process which serves to meet all the demands of many teachers but which leaves the pupil unacquainted with the greatest educational value of arithmetic. Facts merely memorized build up only superficial knowledge and the operations of arithmetic become mechanical. The pupil is not able to think number in relation to problems. The unit value of numbers is not considered. Consequently a six is always thought of as being smaller than a nine no matter how it is involved in a problem.

Instead, therefore, of requiring the pupils to commit the multiplication table to memory without making any effort to have them see clearly its significance, the following plan aims to set forth as fully as possible in the scope of a single lesson a more fruitful exercise. The apperceptive basis for this particular lesson has been provided for by teaching the pupils to count by twos as far as ten.

LESSON PLAN.

Preparation.—The teacher directs each pupil in the class to take two objects of his own selection, then two more of the same kind, and again two more of the same kind. Each two is to be kept by itself so that each pupil has three groups of two objects. The pupils are now able by addition of twos to tell how many objects there are in all, in the three groups before them.

Presentation:

Tr "Each one may be ready to tell us how many *twos* you have and the kind of objects you used. What have you, Mary?"

M. "I used books and have three twos of them."

T. "You may tell us what Harold has placed upon his desk, Mabel."

M. "Harold has three piles of pennies with two pennies in each pile."

T. "Let us see what John has drawn upon the blackboard. You may tell us, Marion."

M. "John has drawn three groups of boys' pictures with two pictures in each group."

T. "How many pennies did you need in order to make three piles of two pennies, Harold?"

H. "I had to have six pennies."

T. "Then three piles of two pennies makes how many pennies in all?"

H. "Three piles of two pennies make six pennies."

T. "You may tell what you have and the number it makes in all, Ina."

I. "I have three groups with two pencils in each group and it makes six pencils in all."

Drill:

The pupils may be required to make new groups using different objects. This work to be continued until in the teacher's judgment the majority of the class are prepared to give a general statement, or answer the following question intelligently: "Three groups of two objects always makes how many objects in all?"

Application:

(1) How many apples would you need in order to arrange three groups of two apples upon my desk?

(2) A man walked two blocks east, then two blocks north, then two blocks west. How many two-blocks did he walk? How many blocks did he walk in all? Draw a picture of the path he took.

(3) If it takes two pennies to buy a postage stamp, how many pennies will three stamps cost? Arthur may take Harold's pennies and place them beside the three postage-stamps which I have here so as to show that the three stamps cost me six cents.

(4) Three people have how many hands in all?

SEAT WORK AFTER RECITATION.

Place upon the blackboard a number of statements and have the class either arrange objects to represent the statements or let them draw pictures to illustrate them. For instance, one statement might be:

3 groups of two trees = —— trees.

Allow as much freedom as possible to the pupil in the arrangement of his representations of these statements.

Division with Carrying and Remainder.

By Mary F. McAleer, Principal, New York City.

Previous Preparation: Children have been working in division for two years with a single divisor. In the second half of the second year the "remainder" is introduced, but "carrying" is left until the third year is reached.

The short division form $\begin{array}{l}4\,)\,\underline{8}\\ \quad\; 2\end{array}$ has been used entirely. "There does not seem any necessity for beginning formal division by the 'long division' process. The pupil knows that $2 \times 5 = 10$ and $10 \div 5 = 2$, ***whatever may be the unit of measure.*** He knows that ten ones divided by five is two ones, that ten tens divided by five is two tens, that ten hundred units divided by five is two hundred units," etc. (Psychology of Number.)

Nevertheless, when the stage of carrying is reached, the "long division" form, though the divisor be only one figure, is notably preferred for the sake of the steps involved.

FIRST STEP.

Aims: Teacher's: To teach division with carrying.
Children's: To divide 84 sticks among 7 boys.

Preparation: Have 87 sticks arranged on the table in bundles of tens and units. Statement of children's aim will serve as preparation. Yesterday we divided 84 sticks among 4 boys. To-day we shall divide them among 7 boys.

Q. When we divided 84 sticks among 4 boys, what did we divide first? A. The tens.

Presentation: How many have we here? A. 8 tens.

T. Divide them among these 7 boys so each will have the same number. (Child distributes.)

Q. How many tens have you used? A. 7 tens.

Q. How many tens did you have to use? A. 8 tens.

Q. What has happened? A. I have 1 ten left over. (Holding it up.)

Q. What can you do with 1 ten? A. Break the bundle into 10 units.

Q. Did you have any more units? A. Yes, 4 units more.

Q. How much are 1 ten and 4 units? A. 14 units.

T. Give out the 14 units.

Children counted the number of times the child went to each pupil.

Q. How many sticks or units were given to each child? A. 2 sticks or units.

Q. If each child has been given 2 sticks or units how many units have been given out altogether? A. 14 sticks or units.

Q. How many are left? A. None.

T. Now, I shall show you this division with figures.

Q. Who can tell me the name of the number we divide? A. The dividend.

Q. What part of the dividend did we divide first? A. The tens.

Q. How many tens in the dividend? A. 8 tens.

Q. What is the divisor here? A. The divisor is 7.

Q. 8 tens among 7 boys, how many did each one receive? A. 1 ten.

Q. Where would you write it? A. Over the tens in the dividend.

Teacher or pupil writes
$$\begin{array}{l} 1 \\ 7\overline{)\,84} \end{array}$$

Q. If 7 boys have 1 ten each, how many tens have we used? A. 7 tens.

Q. Where would you write the 7 tens? A. Under the 8 tens.

Teacher or pupil writes
$$\begin{array}{l} 1 \\ 7\overline{)84} \\ 7 \end{array}$$

Q. When you gave away 7 tens, what happened? A. 1 ten was left.

Q. Where do you write the one ten? A. Under the tens.

Write
$$\begin{array}{l} 1 \\ 7\overline{)84} \\ \underline{7} \\ 1 \end{array}$$

Q. We have taken 7 tens from 84, how many tens and units remain? A. 1 ten and 4 units.

Q. Where shall we write the units? A. Directly under the units.

T. Do that, placing the 4 units beside the tens.
$$\begin{array}{l} 1 \\ 7\overline{)84} \\ \underline{7} \\ 14 \end{array}$$

Q. One ten and 4 units, how many units?

Fourteen units among 7 boys, how many has each? A. Each has 2 units.

Q. Where do you write the two units? A. Over the units in the dividend.

$$\begin{array}{l} 12 \\ 7\overline{)84} \\ \underline{7} \\ 14 \end{array}$$

Q. If 7 boys, etc., how many units have you used? A. 14 units.

Q. We have used 14 units. How many units shall we take away? A. 14 units.

Q. Where do we write the 14 units we wish to take away? A. Under the 14 units.

$$\begin{array}{r}
12 \\
7\overline{)84} \\
\underline{7} \\
14 \\
\underline{14}
\end{array}$$

Q. Fourteen units from 14 units, how many remain? A. No units.

Q. What is the quotient of $84 \div 7$? A. The quotient is 12.

Application: Many similar *examples* should be given, so that children can divide a number of any two digits by any of the single digits. They should see, for instance, that 8 units of any order in the decimal system (84, 840, 8400, 84000, etc.) when divided by 7, will give 1 unit of that order, with 1 unit of that order, or ten units of the next lower order remaining, which 14 units on division by 7 gives 2 units of that order, making the total quotient 12, etc. Examples should be both concrete and abstract. Next step in division involving a separate lesson. $7\overline{)87}$

This should be developed the same as the preceding. In the grades below 3B the course of study does not call for the remainder to be written as a fraction. The children readily see, as in divide 9 sticks among 4 children, that one stick will be left over. The statement was readily obtained from children in a 2B class that in order that each child should have the same portion this stick would have to be broken into 4 parts and one part given to each child so each would have 2 and one-fourth sticks. When 3 were left over as in the case of 7 among 4 children, after a little questioning the same children explained that each child would receive 1 whole stick and $\frac{3}{4}$ of a stick. When this has been concretely illustrated many times, children are ready to write the remainder in form of a fraction. As:

Q. In subtraction, what do we call the answer? A. The remainder. $7\overline{)87}$

Q. What shall we call the 3 units left in this example? A. The remainder.

Q. Of what number is 3 a part? A. 87; 3 will not contain 7.

Q. No, but we will show that we wish to divide it, by writing it in this way $\div \frac{3}{7}$.

Q. What is the quotient of $87 \div 7$? A. 12 and $\frac{3}{7}$.

Application. Numerous examples should be taken up, before the ***next step.*** Thus, suppose 630 is to be divided by 4.

Presentation: Concrete illustrations with sticks arranged in hundreds, tens and units. Select 4 boys and proceed to have the sticks divided among them From previous experience they should remember to commence with the highest order first. When this has been done, show with figures. Statements. $\begin{array}{r}4\,)\,\underline{630}\\175\end{array}$ Here 4 will divide 6 giving a quotient 1 of the same order, *i. e.*, 1 in the hundred units, with 2 of the same order or 20 of the next lower order remaining; which with the 3 of that order gives 23. This divided by 4 gives 7 with 2 over. Similarly 2 is 20 of the next order, which divided by 4 gives 5, the last figure of the quotient.

NEXT STEP: $\begin{array}{r}7\,)\,\underline{3682}\\526\end{array}$

Suppose 3682 is to be divided by 7: $\begin{array}{r}7\,)\,\underline{3682}\\526\end{array}$ Here 7 will not divide 3 giving a quotient of the same order, *i. e.*, in the thousand units; the 3 is changed to 30 units of the next lower order, making with the 6 of that order, 36. This divided by 7 gives 5, with 1 over. Similarly this 1 is 10 of the next order, which, with the 8 of that order, makes 18; this divided by 7 gives 2, with 4 over; this 4 is 40 of the next order, and with the 2 makes 42 of that order, which divided by 7 gives 6, the last figure of the quotient.

Children should explain the examples. This will cultivate language and bring in variety.

Generalization: "Any statement of a definition, law, or rule should be the immediate outcome of the thinking that has gone before, otherwise it is an imposition upon the child.

"The uselessness of such a memorized definition is seen from the fact that, when once forgotten, there is no way of reproducing it except by turning to the book. Now the fact is that any rule or general truth taught to a child in school will *probably* be forgotten; that is discouraging, but it is certainly true; and as the text-books are not to be kept at hand throughout life, how is the definition to be made available?

"Sometimes, especially with young children, it seems advisable not to teach the rule at all, relying upon the concrete facts, whatever their nature, to suggest it of themselves. This applies to arithmetic and to literature as well as to other studies."

Particularly is this true in the case of division.

"Little people who cannot appreciate the statement of an abstract rule may remember how a typical example was worked and solve another in the same way."

Division Where the Divisor Is Greater Than Twelve.

By Martha Adler, Instructor, New York City.

I SHOULD class the difficulties met with in the teaching of long division under two general heads: *A*. That in long division all the inaccuracies, the lack of drill, and the weak spots of addition, subtraction, multiplication and division are encountered; that every stumbling-block in the teaching of the elementary rules, from the simple weakness in subtraction to the more formidable difficulty in the "unequal divisions," stands out in broad obstruction to a clear way. *B*. That in long division we meet, for the first time, that most difficult yet most valuable point in all mathematics—*approximation*. The child is accustomed to being taught a fact, to apply it, and to feel that this is, and must be true. He is taught that 2 × 2 = 4; he finds this to be true whether he multiplies 2 by 2, 22 by 2, or 222 by 2. How different when he is met by some such number as 5962 to be divided by 22! He has not learned the 22 table. He must be judge, and so use the facts he already knows as to enable him to approximate the number of times this number is contained in the dividend before him. But he may multiply to find out, I am told—that, is the keynote; *he must find out without completing* the *multiplication*, he must learn to approximate, and that closely, and in so far as that end is reached, in so far as he is able to approximate the actual value with nicety, in so great or less a degree have we succeeded in the teaching of long division.

Our teaching, especially in the first three or four years, should have in view not so much the imparting of knowledge and the giving of so many facts, as the training of the *powers*. The familiarity with the old should carry with it the ability and readiness to acquire the new. What ability, what power, can be of greater value to the child in later years than a nice appreciation of approximate values, leading quite naturally to a good, sound judgment.

The work in long division is here outlined in a series of lessons, each one containing some new point. The new lesson is dwelt on for several days, in many cases, before the succeeding one is taken up.

Lesson I.—Aims. *A*. To familiarize the child with the process of long division. *B*. To show difference between short and long division. *C*. To teach the need and use for long division.

$$\text{Example given:}\qquad \begin{array}{r} A. \\ 4\underline{)92} \\ 23 \end{array} \qquad\qquad \begin{array}{r} B. \\ \underline{23} \\ 4)92 \\ \underline{8} \\ 12 \\ \underline{12} \end{array}$$

This example is worked in both ways. The oral expression of he work in example *A* is written in example *B*, thus: 4 is conained in 9, twice and 1 over, or 4 is contained in 9 *tens*, 2 *tens* imes, and 1 ten remaining.

Place 2 in the quotient in the tens place, in *A* below, in *B* bove the 9. We must multiply the divisor *4* by the figure just placed in the quotient *2*, and 8 tens is the product; in *B* we place 8 tens under the 9 tens; subtracting, we have 1 ten as our remainder.

This 1 ten, together with our remaining figure in the dividend, forms our new dividend of 12 units. Or, bring down the next igure in the dividend, *2*. Then 1 ten and 2 units = 12 units; 4 is ontained in 12 units, 3 units times. Multiplying the divisor by his new quotient figure *3* our product is 12, and we have no emainder. The quotient is 23.

Following this example, several others of a similar type are aken:

$$7\overline{)183} \qquad 4\overline{)692} \qquad 8\overline{)943} \qquad \text{etc.}$$

The work in all these examples is done by both methods, the ong and short division, until the children become fairly familiar vith the various steps, *Divide: place* the *figure* in the *quotient* over he corresponding figure in the dividend; *multiply* the *divisor* by it; *ubtract*, and *form new dividend.* It is not necessary to wait till all hildren become thoroughly conversant with the entire process. We wish merely to introduce the formidable long division in conection with some old friends and to acquaint the child with its various steps.

We ask which method, the long or short, is preferred? The nswer is invariably the short, because it is shorter. The difference between the two is usually given. "In long division the work is all written out,—in short division it is remembered or done in the mind."

Following this we ask: "What is the use of Long Division?" and finally arrive at the conclusion that "long division *must* be employed for divisors we have not learned the tables of, that it *may* be employed for *all* numbers whether above or below 12, and that it would not need to be used at all, if we knew the tables of all the numbers there are.

LESSON II.—AIM. To *teach use* of *trial divisor.*

Place on blackboard the following drill:

21) 42 65 84 76 98
31) 64 42 98 75 34
41) 44 98 167 329 294
71) 85 153 214 294 362
91) 98 457 372 729 653, etc., etc.

We are to use *21* as our divisor. We do not know the 21 table, but we *do* know something about 20 or 2 tens. 21 is so near 2 tens that we use it as *2* tens, and *2* is our trial divisor.

What shall we use as a trial divisor with 31, with 41, with 71, etc.?

Using *2* as a trial divisor, the drill is as follows:

2 is contained in *8*, 4 times, or the left-hand figure (2) of the divisor is contained in the left-hand figure of the dividend (8) 4 times, hence 21 is contained in 84, *4* times; 21 is contained in 63, 3 times, because there are 2 threes in 6. In 98, 4 times.

71 is contained in 294, 4 times, because 7 is contained in 29, 4 times.

This drill is entirely oral, though where children hesitate, or, in fact, to better explain the work, it is written thus:

$$\begin{array}{r} 7 \\ 91\overline{)653} \end{array}$$

and explained as follows:

9 is contained in 65, 7 times, hence 91 is contained in 653, 7 times. Place the *7* over the *3*, because:

A—91 is not contained in 6 or 65, but *is* contained in 653, 7 times.

or—

B—91 is not contained in 653, hundreds or tens times, but 7 *units* times.

Reason *B* should be recalled occasionally. *A* is used by adults and suffices for children, as a rule, though its mathematical accuracy may be questioned.

Besides the oral drill, examples are then worked, thus:

$$\begin{array}{r} 41 \\ 21\overline{)861} \\ \underline{84} \\ 21 \\ \underline{21} \end{array}$$

21 is not contained in 8, but is contained in 86, hence 86 is the "part of the dividend" or "*partial* dividend," we first use.

2 is contained in eight 4 times, and we place the *4* in the quotient, over the *6*.

We multiply the divisor 21 by the figure *4* just placed in the quotient. 84 is then "the part of the whole product" or *partial* product.

Subtracting partial product from partial dividend, our remainde is *2*.

We then form our new dividend by bringing down the next figure in the dividend which has *no* figure over it in the quotient. This is 1 unit, and with our remainder *2 tens* or 20 units, gives us as our new dividend 21 units. The divisor 21 is contained in the partial dividend 21, *once*. 1 is placed in the quotient, over the 1 in the dividend, and the quotient is 41.

Many examples similar to the above are worked. The divisors having 1 as units figures, the dividends consisting of 2, 3, or 4 figures, according to the proficiency of the class:

$31\overline{)98}$ $\quad$ $41\overline{)876}$ $\quad$ $51\overline{)6532}$

Just here, too, we introduce some examples using *13* as a divisor. The *13* table has been taught, and examples are worked in both ways, or children are allowed to choose their own way of working, either long or short division.

LESSON III.—AIM. Use of trial divisor continued, and to teach that partial product *must not* be *larger* than partial dividend.

Drill on blackboard:

22)35, 46, 41, 66, 64, 85.

Drill as follows:

22 is contained in 35 once (2 is contained in 3 once)
46 twice (2 " 4 twice)
41 (*twice* first answer)

but twice 22 equals 44, hence we know 22 is contained in 41 once. Similarly 22 is contained in 64 twice, in 83 three times, etc.

In giving drills for the use of the trial divisor exceptions must be introduced gradually and judiciously, for we wish to impress children with the idea that the trial divisor *is* a help. So that in extending the above drill care should be taken that not a very large percentage shall require correction:

22)61, 130, 421, 546, 620.
32)134, 124, 62, 95, 160.
42)240, 146, 169, 164, 210, etc.

Examples are then worked as follows:

$22\overline{)616}$

2 is contained in 6 three times, but three times 22 is 66; this is larger than 60, the partial dividend, hence we try *2* as our quotient figure. The partial product is now 44 and the remainder 17. Bringing down the next figure in the dividend which has no figure over it in the quotient, we form our new dividend, *176*. Our quotient figure is *8*, and, multiplying, the partial product equals 176.

Following this many examples of similar nature are taken, including those in which partial product and partial dividend are the same. From these we derive one of the great underlying principles in the work in long division: "*That the partial product must* NOT *be* GREATER *than partial dividend.* This is committed to memory, and is referred to continually and almost incessantly for awhile, each partial product being examined and the statement given as to why it is deemed correct.

LESSON IV. Just here a little training is given in "seeing the partial product without actually writing it." The drills here admit of endless variety and awaken a very keen and active interest. Only the first partial dividend is used in the oral drill:

42)804, 169, 298, 360, 225.
62)1250, 445, 3124, 568, 4800, etc.

This drill is as follows:

42)804—4 in 8, twice; twice 42 = 84 try 1.
62)1250—6 in 12, twice; partial product, 124,
correct because not larger than partial dividend, etc.

We require children to say, too, over which figure in the dividend the first quotient figure is placed, or, in consequence of the use of the "left hand part" of the partial dividend and trial divisor, children may place quotient figure in wrong place.

The drill may be given thus:
62)4805—6 in 48, 8 times; partial product 496; try five; place 5 over 0, etc.

It is an excellent exercise of the mind, this "seeing the product without actually writing it," and is a rapid method for the brighter children. To assist those who have less imaginative power and always want to "put down something," we have sometimes told them to "make believe" writing the figure in the quotient, so that some of these practical little lads move the finger rather than the pencil in placing a "make-believe" figure in the quotient, multiply and gauge the correctness of their partial quotient without using the pencil. Some children, of course, work out the process, and will believe themselves right or wrong only by what they *see*, and rub out accordingly.

LESSON V. To teach use of next higher ten's figure as trial divisor, and that

Remainder must be *less* than *divisor*.

Place drill on blackboard:

29) 69 92 129 217 284
19) 40 65 93 105 135, etc., etc.

We used *2* as trial divisor with 21, because it was near 20.

What shall we use as a trial divisor with 29? *3*, because 29 is near 30.

What with 39? 49? 69? etc.

Example worked:

$$\begin{array}{r} \underline{2} \\ 19)437 \\ \underline{38} \\ 5 \end{array}$$

19 is nearly 20, hence *2* is our trial divisor. 2 is contained in , twice. The partial product, 38, is right, because smaller than he partial dividend. Remainder, 5, new dividend, 57. By using he trial divisor, *2*, our quotient figure is found to be *2*, the partial roduct 38, and the remainder *19*. This is just the same as our ivisor, so that we can get another 19 out of 57, or 19 is contained n 57, 3 times. To explain this point more fully, the partial divi-end, *57*, is considered as a number of marbles, which we wish to ivide into groups of *19* each. The trial divisor 2 would lead us to uppose that we could make only *two* groups, but we find we have 9 remaining, hence we can make another group of 19.

Or the dividend 57 is 57 cents, and we buy all the 19-cent balls ve can; we buy 2 balls at first, but, finding we have 19 cents emaining, we buy another ball.

The partial product is here found to be 57, and is correct in hat, while it equals, it does not exceed the partial dividend.

This is followed by a number of examples of a similar type:

$29\overline{)669}$ $18\overline{)265}$ $52\overline{)2009}$, etc.

rom which we derive another underlying principle in the work in ong division—"That the *remainder* must be *smaller* than the ivisor." This also is memorized, and referred to continually, each emainder being judged, by comparison with the divisor, as right r wrong.

Before the next point is taken up considerable drill is required n the points already taken.

The drills and examples worked should include divisors having mall unit's figures 1 and 2, and those having the higher units gures 8 and 9.

The rules in regard to partial product and remainder require ontinued drill. Then, too, the children discover that when the *artial product* is *too large*, the *quotient figure* is *too large;* but when he *remainder* is too large, the quotient figure is *too small.*

Variety may be introduced in the work in the introduction of ' naughts" in the dividend, and in the *practical* questions involving he points already covered.

LESSON VI. Divisors having *5* as the unit figure.

Place on blackboard

35) 185, 215, 264, 153, etc.

(I purposely begin with 35 rather than 15 or 25, as children are oo familiar with these tables.)

With 35 as a divisor, what shall we use as our trial divisor? This is rather a question for children who have become quite proficient in the use of the trial divisor.

35 is just half-way. They suggest 3 and then 4. We agree to try both.

35)185. *3* is contained in 18, 6 times; *4* is contained in 18, 4 times.

We therefore try half-way between, or 5.

35)215. 3 is contained in 21, 7 times; 4 is contained in 21, 5 times. Hence we try *6*, etc., etc.

This is quite an interesting drill, and one which the children thoroughly enjoy. Somehow there is a little pleasure in "splitting the difference," and the drill must be arranged with a view to establishing this point. Many examples may be taken here, and though some will require correction, when partial products and remainders are examined, the work in approximation is being carried on in a thoughtful way.

LESSON VII. Divisors having 3 or 4 as unit's figures.

23)190, 152, 100, 85, 40

The new question, "What shall we use as our trial divisor, when 3 and 4 are unit's figures?" is met by the answer that we use the ten's figure as *in the divisor*, since 23 and 24 are nearer to 20 than to the next higher tens.

The drill is as follows:

23)190. 2 is contained in 19, 9 times; but 9 times 23=207, is too great, so we try *8*.

23)152. 2 is contained in 15, 7 times, 7 times 23=161, hence we try 6.

23)100. Here we again find 5 times 23 too great and try *4*.

This may be continued with several others.

34)197 162 250 290
43)290 200 340 120
54) 152 358 460 216, etc.

The children are about ready to tell us, by this time, that while the trial divisor is used as heretofore, we take as our quotient figure *1 less* than the trial divisor gives us; thus:

43)290. 4 is contained in 29, 7 times; try *6*.

43)200. 4 is contained in 20, 5 times; try *4*.

When asked why we try *1 less*, we are told that 23 is *larger* than 20, and will be contained in the dividend a smaller number of times than 20. This is a very elementary way of saying, "The larger the divisor, the smaller the quotient."

Examples should follow to illustrate the point taught, though a close examination of partial product and remainder will correct any deviations.

2065÷53, 3122÷64, 4130÷83, 5026÷74, etc., etc.

LESSON VIII. Divisors having 6 and 7 as unit's figures.

26)118 135 240 158

When the unit's figures are 6 and 7 we use the next higher tens as our trial divisor, since 26 and 27 are nearer 30 than 20.

Drill as follows:

26)118. 3 is contained in 11, 3 times, subtracting partial product from partial dividend the remainder is too large, hence we try *4*.

26)135. 3 is contained in 13, *4 times*, but the remainder is again found to be too large, hence we try 5.

26)240. 3 is contained in 24, 8 times; too large a remainder again causes us to try one larger, or *9*.

This drill may be continued as follows:

37)295 340 149 232
67)278 550 140 470, etc., etc.

The children will soon reach the conclusion that while we use the next higher tens figure as our trial divisor (when the unit's figures are 6 and 7), we try *1* more than the trial divisor gives us, thus:

67)278. 7 is contained in 27, 3 times; hence, try 4.

67)550. 7 is contained in 55, 7 times; hence, try 8, etc.

The reason for trying *1 more* is given here, that though we use 27 as though it were 30, as a trial divisor, 27 is smaller than 30, and will therefore be contained in the dividend a greater number of times.

Giving us the converse of our former deduction—"The smaller the divisor, the larger the quotient."

This point should again be illustrated by examples:

4574÷76 1469÷27
7820÷17 2378÷36, etc., etc.

With Lesson 8 I should consider that all the *crucial* points "in division where the divisor is more than 12" had been covered. The dividends may be made larger, to consist of 5, 6, or even 7 figures, while the work with the divisor of *three* figures may be introduced and followed out in the same manner as that with the divisor consisting of two figures. The *hundred's* figure being the trial divisor, and the *ten's* figure being the determining factor in its use.

Divisors first used should be:

101 209 827 925, etc.

Following these should be taken:

295 681 398 596, etc.

Finally should be introduced:

853 642 739 574, etc.

Partitive Division Without a Remainder.*

By W. A. Shoemaker, Supt. of Schools, St. Cloud, Minn.

1. How many groups of 3 marks=6 marks?

2 (groups) of 3 *marks*=6 marks.

2. Separate 6 into 2 equal groups. 2 groups of how many marks=6 marks?

2 (groups) of 3 marks=6 marks.

How many ones or single marks to be divided? Six ones, or the number of ones in all the groups is the DIVIDEND. How many ones are there in each group? The number of ones in each group is the DIVISOR.

Consider the divisor as a unit, *a three*. How many threes are there in six? In 2 threes, what is the denomination or unit value of the 2 ? Two (threes) or the number of groups is the QUOTIENT.

What is the dividend? 6 what? 6 *ones*.

What is the divisor? 3 what? 3 *ones*.

What is the quotient? 2 what? 2 *threes*.

Which of these terms are of the same name or denomination?

The divisor and the dividend are of the same denomination. The unit value of the quotient is the whole divisor.

Place 2 groups of 3 cents each on the table. Point to the 2. Point to the 6. Which would you prefer, the 2 or the 6? Point to the 3. Which would you prefer, the 6 or the 3?

Notice carefully the difference between Ex. 1 and Ex. 2. In Ex. 1, we find the number of groups. In Ex. 2, we find the number in a group. By what term do we divide in Ex. 1? This process may be called *Division by the Divisor*. By what term do we divide in Ex. 2? *This* process may be called *Division by the Quotient*.

Notice the same distinction in the following problems:

a. If one hat costs $3, how many can you buy for $6?

2 (groups) of $3=$6.

b. If 2 hats cost $6, what is the price of 1 hat?

2 (groups) of $3=$6.

By what do we divide in Ex. *a*? How does $3 compare in denomination with $6? What process of division is this? By what do we divide in Ex. 2?

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*From New Practical Arithmetic, American Book Co. By permission.

l. //// //// m. // // // // n. /// /// /// /
o. // // // p. //// //// / q. /// /// /
r. //// //// // s. /////// t. // // // // /
u. // // // // // v. /// /// /
w. ////////// x. // //

Read examples l to x as examples in division by the divisor; s, how many (groups) of 3 marks in 6 marks? 2 (groups) of 3 narks=6 marks, etc.

In example m, name the dividend, divisor, and quotient. The lividend is 8 what? The divisor is 2 what? The quotient is 4 vhat? How does the divisor compare with the dividend in name r denomination? Point to the quotient. Point the dividend. Vhich is greater?

Name the terms in each of the examples from l to x. In example n, one mark is the *remainder* left after division.

Read each example from l to x, expressing it in all the ways hat division by the divisor is usually expressed; as,

Example l. //// ////

1) How many fours in 8? (5) 8 divided by 4 groups equals what?
2) How many groups of 4=8? (6) How many times 4 is 8?
3) ——— of 4=8 (7) How many times is 4 contained
4) 8÷4= ——— in 8?

Make two problems to fit each one of the following statements, ne in division, one in multiplication, and one in division by the ivisor:

a 2 (groups) of 3 cents=6 cents.
b 5 (groups) of 2 spoons=10 spoons.
c 2 (groups) of 4 miles=8 miles.
d 3 (groups) of 3 cherries=9 cherries.

Peter sells 3 oranges at 3 cents each, and buys pencils with the noney at 2 cents each. How many pencils does he buy?

He will buy 4 pencils. How many cents will he have left?

How many pairs of shoes in 10 single shoes?

The boys have got up a circus, tickets 2 cents apiece. How nany children can be admitted?

Six cents will buy how many 3-cent stamps?

Point out the terms in each of the above examples.

Read examples l to x in all the ways commonly used to express division by the quotient.

/// ///

(1) Separate 6 into 2 equal parts. (4) 2 of ——— =6
(2) ½ of 6= ——— (5) 6÷2 =———.
(3) 2 (groups) of ——— =6. (6) divided by 2= ———.

1. If 5 planes of the same value cost $10, what is the price of one plane?

2. Sarah made 4 aprons out of 8 yards of cloth, using the same number of yards for each. How many yards in each apron?

In the above example, name the terms. The quotient is 4 *what?* Remember that the quotient has the divisor for its denomination, or unit value. The number of aprons indicates the number of 2 yards, which is the quotient. Quotient, 4 two-yards.

Read examples 1 to x naming the terms. What does the divisor become in multiplication? What term in multiplication is the same as the quotient in division? Of what terms in division is the dividend the product?

State all the differences you can between:

(1) Quotient and divisor.
(2) Multiplier and quotient.
(3) Dividend and quotient.
(4) Multiplier and divisor.
(5) Multiplicand and divisor.
(7) Product and multiplier.

Which terms are identical in things?

	Factors:		
	Multiplier or Quotient.	Multiplicand or Divisor.	Product or Dividend.
Multiplication	2 (groups) of	4 cents=	——— cents.
Divis. by divisor—	(groups) of	4 cents=	8 cents.
Divis. by the quotient	2 (groups) of	– cents=	8 cents.

Federal Money, Its Addition and Subtraction.

By GEORGE GOMBARTS, Instructor, New York City.

THE course of study for the Boroughs of Manhattan and the Bronx, requires in Grade 3A (third year, first half) very simple written problems involving the addition, subtraction and multiplication of amounts in Federal Money. More and more importance is attached to the subject as the child progresses toward the upper grades.

Prior to entering school almost every child is somewhat familiar with the coinage of the country. This knowledge is unconsciously acquired through the self-activity of the child in its dealings with concrete problems of ordinary life which include the handling of sums of money, especially in the "getting of change." He sees, feels, and handles money. The child recognizes the smaller coins and their values; but, as likely as not, cannot give written expression to his knowledge. The art of giving written expression to this knowledge is what the child must next acquire.

Before taking up addition of Federal Money, it is advisable to review the several steps in teaching addition of simple numbers; in fact, it is part of the necessary preparation.

It should be shown that every quantity in simple numbers has a fixed value which is dependent on the position of the component digits. Illustrate on B. B.:

$$\begin{aligned}222&=200+20+2\\&=2\,(100)+2\,(10)+2\times 1\\&=2\,(10\times 10)+2\,(10\times 1)+1\times 1.\end{aligned}$$

Moreover, "carrying", the reasons for which have been explained in the preceding grade, should be given due attention. The signs for dollars ($) and cents (¢) should be explained to the class. The answer should be elicited from the pupils. The words should be written on the B. B., with the signs alongside. The table should then be learned:

1 dollar $= 10 dimes
1 dime= 10 cents (¢)
1 dollar $= 100 cents (¢)
$1 = 100¢

Simple problems in addition should follow, the amounts involving either dollars or cents. Attention should be called to the fact that mills are not coined; they are usually expressed as parts [illegible] a cent.

The method of writing amounts in dollars and cents should next be shown on the B. B. Thus: Three dollars twenty-five cents, $3.25—read it. Write twelve dollars, fifteen cents on [illegible] B. B. Have the class read

$2.50
4.60
8.75
12.16

Give a number of problems so as to impress the important fact. Now call attention to the "point." Tell the class its name and that the shortest way of writing dollars and cents is to place the dollars to the left and the cents to the right of the point.

Write on the B. B. several amounts in a column; have the children read them. Call upon the pupils in turn to write on the B. B. amounts which are given them. Let them read the amounts after writing them. Dictate a series of amounts to the class to be written on paper; have these placed on the B. B. by some of the pupils. This drill should be practiced for a few minutes. First drill in writing dollars, then dollars and cents, and lastly, cents alone, taking care to dwell on the particular case where tenths are missing. Dictate on B. B., $15., $5., $12., $2.; $8.60, $2.43.

a	b
$.15	$.03
.24	.09
36	.08

Neatness and accuracy should first be aimed at; speed in writing amounts will come with practice.

Amounts should be written one under the other, cents under cents, dollars under dollars, and the points in a line.

Thus far, the method of writing amounts and the location of the decimal point have received our attention. The pupils will readily discover for themselves the rules of addition. Write the following on the B. B.:

$4.25
3.84
2.95
$11.04

Have these read and tell the class to proceed as if they were adding the simple numbers 425, 384, etc., neglecting the sign and the point. Then, having performed the operation of addition, insert the decimal point under the other points and prefix the dollar sign. Drill at this point would be very valuable.

In subtraction the same methods should be pursued. The ion of simple numbers should form part of the preparation. problems which do not involve "borrowing" should be hen such as necessitate "borrowing." Drill upon this work follow.

lengthy an explanation will weary the child; the child's vity should play an important part in this subject as in The teacher should not be guilty of "lecturing." The iterest which children feel in working out practical problems terially lighten the teacher's labors.

s not necessary to show the class pieces of money as the are more or less familiar with the different coins and their value.

l problems should always precede written work. Problems ng addition and subtraction should be given. Let the chil- d long ledger accounts and cash receipts.

Find the sum of $ 3.26
23.47
15.03
321.75

II. Add $2.46
5.94
7.55
8.69

$17.42
35.81
4.07
9.68

IV. $76.45
40.36
5.84
.60

V. From $154.15
take 132.11

A merchant's sales for five days were
$123.40
87.25
145.15
125.00
142.90
as the amount of his sales?

A man who receives a salary of $1525 a year pays
$236.00 for rent,
397.60 for food,
297.40 for clothing,
145.00 for other expenses.
uch has he left?

I. A. borrowed of B. $64.50 and paid back $37.70. How oes he still owe?

A merchant bought goods for $17.25 and sold them for What was the gain?

I bought a horse for $325.75 and a cow for $150.50. I horse for $485.95 and the cow for $210.80. How much did y the sale?

A farmer sold wheat for $349.15, oats for $175.85 and rye 7.95. What was the amount of his sales?

The Second Type Problem.

By Julius Hyman, Instructor, New York City.

THE work in fractions in Grades 1A-3B has familiarized the pupils with problems involving the finding of fractional parts of the multiples of 2, 3, 4, 5. Problems of the first type,—to find the part of a number—are reviewed, and the pupils are now ready for the new work.

A strip of paper tape, unmarked, is cut in two, *A* and *B*, in the ratio of 16 to 8. They are held up to the view of the class.

Ques. "How many pieces have we here?" Ques. "Are they equal in width? in length?" Ques. "Which is the shorter? the longer?" The pupils are informed that they have been making comparisons between the two objects. But one piece is now presented. Ques. "Which is longer?" Ans. "Can't do it." Ques. "Why not?" Ques. "Then how many things do we need, to draw a comparison?"

The teacher holds *A*, while a pupil experimentally compares *B* with it.

Ques. "*A's* length is how many times *B's* length?" Ans. "Twice." *B* is folded and compared with *A*. Ans. "4 times." *B* is folded once more and compared again with *A*. Ans. "8 times." Ques. "Which is the paper alongside of which we placed the other? Which is the paper whose length we did not change when we made these comparisons? Let us call this one our standard, our measuring stick." The teacher calls for standards of measurement in common use. These exercises are to be conducted with a number and variety of articles sufficient to give the child the abstract idea of comparison or ratio, separate and apart from the size of the things compared. "*Parvum ex multo*" should be our guiding star. Before each comparison is made the pupil is requested to select and name the standard. Articles of such number and dimensions should be chosen as will admit of ready inspection and comparison. By multiplying the illustrations, such as slips of paper in the hand, lines on the blackboard, and articles on the desk, the child is led to see that for our purpose, either object may serve as the standard of comparison. Three, four, and five objects may be compared with the one standard, but the child will see that the comparison itself is made between but two at any one time.

Two lines, *1* and *2* inches in length, respectively, are drawn on the blackboard.________, *A*; ________________, *B*. The measurements are not disclosed to the class. Teach. Let *A* be the standard. Compare *A* and *B*. "Ans. *B* is 2 times as long as *A*." This statement is written on the board and under it appear *2:1*. *B* is lengthened inch by inch and the successive comparisons are derived:

$$(1)\left\{\begin{array}{l} B : A \text{ standard.}\\ 2:1\\ 3:1\\ 4:1\\ 5:1\\ \text{etc.}\end{array}\right.$$

The lines are now reduced to their original length, 1 and 2 inches. *B* is made the standard and this series of comparisons is evolved:

$$(2)\left\{\begin{array}{l} A : B \text{ standard.}\\ 1:2\\ 1:3\\ 1:4\\ 1:5\\ \text{etc.}\end{array}\right.$$

Now, when the value of the ratio can be expressed or is reducible to an integer as in (1), the pupil has no trouble in distinguishing between numbers as magnitudes *per se*, and numbers as expressions of relationship or ratio. It is in the next step that difficulty is often encountered. The second series of comparisons is taken up. Teach. "Compare *A* and *B*. The *1*-inch line is what part of the *2*-inch line?" *A* and *B* should be drawn as separate and distinct lines, and not as extensions of the same line; otherwise the child is prone to draw comparisons between the thing compared and the standard itself minus the thing compared. This may be seen in the case where the child is asked to compare one of the fingers on the left hand with all the fingers on that member. Almost invariably he will make the comparison 1 : 4. This mistake does not occur, however, when a finger on the right hand is compared with all those on the left. In early illustrations this tendency can be overcome by selecting the things to be compared from separate and distinct groups.

We may find that when the question is asked, "The 1-inch line is what part of the 2-inch line?" the pupil will hesitate, because he sees before him two separate and distinct entities, and the words "*What part of*," associated in his mind with fractions, implies a cutting up or division, which is here not apparent. By actual measurement he will discover for himself the truth of the statement.

At this stage we have on the board the following statements:—

1:2	2:5	3:6
1 is ½ of 2.	1 is $\frac{1}{5}$ of 5.	1 is $\frac{1}{6}$ of 6.
$1 = \frac{1}{\cancel{2}}$ of $\cancel{2}$.	$2 = \frac{2}{\cancel{5}}$ of $\cancel{5}$.	$3 = \frac{3}{\cancel{6}}$ of $\cancel{6}$.
½ of 2 = 1.	$\frac{2}{5}$ of 5 = 2.	$\frac{3}{6}$ of 6 = 3.

The sign of equality is substituted for "*is*" as early as possible because the value of the equation can more quickly be apprehended when the statement is cleared of unnecessary verbiage and reduced to symbolic form. In reading the statement, however, the verb should always be expressed. Problems of the first type may now be introduced in the form of verification of the new work. The terms of the equation are interchanged. This will enable the child to recognize the identity of the two sides of the equation, that the homologues are but different forms of the same idea, and that they can be substituted one for the other without impairing the value of the equation. Very often a child will glibly rattle off a statement, as, "6 = $\frac{3}{5}$ of 10," when a little skilful questioning will elicit the fact that he is but paying "lip service" to an explanation which he has acquired by rote. Similar difficulty is very often encountered in grammar, in leading the child to perceive that subject and attribute are identical in idea, although separate and distinct in expression.

The equational form will be found to be a great convenience, if not a decided aid, in teaching Type Problem 3, viz.:

Type *2* —*Problem.* 3 is what part of 4?
Work. 3 = ¾ of 4.
Type *3*.—*Problem.* 3 is ¾ of —— ?
Work. ¾ of a no. = 3.
¼ " " = 1.
$\frac{4}{4}$ or " = 4.

While, in the beginning, the pupil is requested to state at length that "2 is ⅔ of 3", later on, in the oral statement, this may be contracted to: Ques. "2 is what part of 3?" Ans. "⅔." Occasionally the full form, orally and graphically, should be required, so that the pupil may revivify the conception of the fraction as an expression of relative value, and not of actual magnitude.

The next step in this problem is developed as follows:

Ques. "3 apples are what part of 5 apples?"
"4 oranges " " " " 6 oranges?"
"3 *apples* " " " " 6 *oranges?*"

The absurdity of the last question appeals to the child's sense of humor, and helps to lead him to perceive that comparisons can be drawn only between like numbers. The pupil is then called upon give a list of like things.

Teach. "In the question, '3 is what part of 4?' have these two numbers like names? Have they any names? Yet can we compare them? When you say 3, you mean 3 what? When you say 4 you mean 4 what?" Ans. "Units or ones!" The child is then led to perceive that an abstract number represents not merely an aggregation of units, but also the ratio relation between that number and unity.

Before written problems are taken up the children should be drilled in

Review—1. Type Problem I.
New Work—2. Work with objects.
3. Graphic reproduction.
4. Concrete problems.
5. Conversion of abstract into concrete problems and vice versa.
6. Conversion of Type Problem II. into Type Problem I.
7. Expansion of symbolic equation into oral statements.

Suggestions for ***oral*** work:

1. "Compare yourself with the number of boys in this class. You are what part of this class? 2. The number of boys on the front settee are what part of this class? 3. Of the boys of this class, what part is absent? 4. The number of boys in the whole class are how many times the number of boys in the first section? 5. A pint is what part of a quart? Which is the standard? 6. Compare a qt. with a pt. Which is the standard. 7. Compare a foot with a yard; a yard with a foot."

Blackboard oral forms:

1. Of 4, 3 is what part?
2. ······ is what part of ····· ?
3. $\frac{1}{3}$ of 15 = —. Type I.
   5 = — of 15. " II.
   5 = $\frac{1}{3}$ of —. " III.

The Third Type Problem.

By Gustave A. Carls, Principal, New York City.

TO FIND A NUMBER, A PART OF IT BEING GIVEN.

1. Preparation. (Concepts developed in the order in which they are to be used in the new lesson.)

What are the terms of a fraction? What does the demoninator show? The number of equal parts into which the unit has been divided. What *is* the denominator? It is the name of the fractional units in the fraction. It is a name—not a number. If the denominator of a fraction is 4, what will that show? That the unit has been divided into four equal parts and that each of these parts is named a fourth. Write $\frac{3}{4}$ in another way. 3 fourths.

What does the numerator of a fraction show? The number of parts in the fraction. How can you compare the size of fractions of the same denomination? By comparing their numerators. Illustrate. Three fourths is three times one fourth. Five eighths is five times one eighth.

2. Presentation. If $\frac{3}{4}$ of a number is 6, what is the number? Write that in another way. If 3 fourths of a number is 6, what is the number?

Take a rectangular piece of paper, twice as long as it is wide, and divide it into eight equal squares.

(If the teacher feels that the class have not the ability to perceive the changeable unit, have the class fold the paper.)

Fold the paper into four equal parts. Fold back one of these parts.

(Fold back, do not tear off, the quarter of the paper. By folding it back we can always keep clearly before the pupils the fact that the paper in view is only $\frac{3}{4}$ of the entire paper,—of the unit we are seeking; whereas, if the part were torn off, there is danger that some of the class would not continue to regard the paper left, as only a fractional part of the unit we are looking for. The slightest vagueness at this point would undo all our efforts.)

What part of the original paper have I now in view? 3 fourths. Three fourths of the paper contains how many squares? 6 squares. One fourth contains how many squares? 2 squares. The original paper contains how many fourths? Four. How many squares? Eight.

Objectively illustrate other problems in a similar manner and choose illustrations in which the mathematical relations are easily accessible. Then leave the concrete and go to the abstract at once.

If three parts are 6, what will one part be?

If three fourths are 6, what will one fourth be?

(Centre the attention of the class on the relative magnitude of 3 rths and 1 fourth. This must be seen *directly*. At this stage of work let no mention be made of the step $\frac{1}{4}=\frac{1}{3}$ of 6 which is 2. pupils are drilled to say this, it centres their attention on the me-nical process which produces the answer and they try *to remember* process and do not try *to think* the step. They lose the mental cipline which a clear perception of the relative magnitude gives. produces "counterfeit exactness " We acknowledge that ratio is essence of mathematics, and it is a clear perception of ratio ich we must aim to secure instead of engaging pupils in a drill on language.

How many fourths do we wish to know about? 4 fourths.

What relation will the number bear to one-fourth of the num-r? It will be four times what one-fourth is, or 8.

Take other problems, *e. g.*, $\frac{7}{8}$ of a clerk's salary is $35. What his salary? Go through the same steps as above in all of these, til you are ready to generalize.

3. *Generalization.* You found that if $\frac{3}{4}$ of a number is 6, $\frac{1}{4}$ of number is 2. This can be obtained how? By taking $\frac{1}{3}$ of 6. ppose the problem reads, if $\frac{2}{5}$ of a number is 8, what would $\frac{1}{5}$ be ual to? 4. This 4 can be obtained how? By taking $\frac{1}{2}$ of 8. owing what a number of parts is, how can you find what one part *By dividing by the number of parts,—by the numerator.*

Now in the former case when you had found that $\frac{1}{4}$ of the num-r was 2, you then said that the entire number was what? 4 times much or 8. In the latter case, after finding that $\frac{1}{5}$ of the number s 4, how did you find the number? The number was five times as ch or 20. In each case what did you do? I multiplied by the mber indicating the denominator. Frame a general rule. *If the ue of a certain number of parts of a number is given, divide by the num-of parts (the numerator), to find the value of one part, and multiply by the number indicating the denominator, to find the number re-red.*

After extensive drill on the application of the above rule and en all the steps are thoroughly mastered, then the short method $\frac{3}{4}$ of a number is 6, the number is $\frac{4}{3}$ of 6 or 8) may be intro-ed. If 6 is $\frac{3}{4}$ of the number, the number bears to 6 the recip-al relation that it is $\frac{4}{3}$ of 6. The mental discipline which can be ured by a clear perception of the identity of this method with the vious gradual steps, must not be lost sight of. Show that when multiply by $\frac{4}{3}$, we are really taking 4 times $\frac{1}{3}$ of 6,—that we are lly finding one part by dividing by 3, and then finding the entire mber by multiplying by 4.

Least Common Multiple.

By James C. Byrnes, Member Board of Examiners, New York City.

Lesson I.—Concept and Definition.

Note: Assume knowledge of multiple and common multiple. Statement of Aim should be omitted.

Preparation: Name multiples of 2; of 3; of 4. (Teacher tabulates on blackboard, as Table A.) What is the multiple of a number? Name multiples common to 2 and 3; 2 and 4; 3 and 4; 2, 3 and 4. (Tabulate as Table B, leaving room for additions to Table A.) What is meant by the common multiple of two or more numbers?

Presentation: Name the smallest or least multiple of 2; of 3; of 4. Name the least common multiple of 2 and 3; of 2 and 4; 2, 3 and 4. (Tabulate as Table C.)

Generalization: What is the least common multiple of a set of numbers? (Give definition in best form.) How was the first obtained? (Obtain answer: *Select from the tables of the multiples of 2 and 3 the smallest multiple that occurs in both tables.*) The second? The third? The fourth? Which is the least common multiple? How may the least common multiple to any set of numbers be obtained? (Answer as above.)

Application: Write multiples of 6 on the blackboard. Find (by inspection of the tables of multiples) the least common multiple to 2 and 6; 3 and 6; 4 and 6; 2, 3 and 6; 2, 4 and 6; 3, 4 and 6. (Add to Table C.) 6 is the least common multiple of what numbers? 10? 12?

What is the smallest measure that will hold a quart and 3 pints an even number of times? etc.

(*Note:* Keep tables on blackboard for next lesson.)

Lesson II.

Finding the Least Common Multiple by Inspection and Without Factoring.

Aim: Let us discover the quickest method of obtaining the least common multiple of a set of numbers.

Preparation: Name the least common multiple to 2 and 4; 3 and 4; 4 and 6, etc. (Answers obtained from Table A.)

How do you find the least common multiple from the tables?

Presentation: Look at the multiples of 2 and 3; what is the least common multiple? What place in the table of 2's is taken by 6? In the table of 3's? Connect the two 6's by a line. Why does the 6 appear in the table of 3's earlier than in the table of 2's? Because 3 being greater than 2 is contained in 6 a less number of times. (Connect similar numbers in the table by lines; notice that they are all common multiples.)

In which table of multiples does the least common multiple to 2 and 4 first occur? To 2, 3 and 6? To 2, 3, 4 and 6?

Generalization: In which table of multiples does the least common multiple to any set of numbers first occur? (Obtain answer: *In the table of the highest number in the given set.*)

Application: Without looking at tables, tell me in which table will the least common multiple of 3 and 4 first occur? 4 and 6? 2, 3, 4 and 6?

How may we quickly find the least common multiple of 3 and 4? (Look in the table of 4's for a number that is also a multiple of 3.) How may we find the least common multiple of 4 and 6? of 2, 3 and 4? Of 2, 3, 4 and 6? How may we find the least common multiple of any set of numbers? (Obtain answer: (Seek in order among the multiples of the largest number, one which is the multiple of the other numbers also.)

Tell how to find the least common multiple to 6 and 8. *Answer:* Is 8 a multiple of 6? Try 2 times 8; try 3 times 8.

To 6 and 10? *Answer:* Is 10 a multiple of 6? Try 20; try 30.

To 8 and 10? *Answer:* Is 10 a multiple of 8? Try 20, 30, 40.

Common Denominator.

Assume knowledge of reduction of fractions to higher terms, nd of the method of finding least common multiple Reason for ducing fractions to common denominator apparent when we try add $\frac{1}{3}$ and $\frac{1}{4}$.

Reduce $\frac{1}{2}$ to sixths; $\frac{1}{3}$; $\frac{2}{3}$.

Reduce $\frac{1}{4}$ to twelfths; $\frac{1}{2}$; $\frac{3}{4}$; $\frac{1}{3}$; $\frac{2}{3}$; $\frac{1}{6}$; $\frac{5}{6}$. Reduce $\frac{1}{2}$ and $\frac{1}{3}$ to ths; to twelfths; to twenty-fourths.

Presentation: What have we done in this example? (Obtain swer: We have reduced $\frac{1}{2}$ and $\frac{1}{3}$ to higher terms.) But we have duced both of them to sixths, to twelfths, and to twenty-fourths, nce we have reduced them to fractions having the same denomitor; another expression for "same denominator" is "common nominator."

Generalization: What is the first common denominator to which and $\frac{1}{3}$ were reduced? The second? The third? Is there any eater common denominator to which $\frac{1}{2}$ and $\frac{1}{3}$ may be reduced? you know of any smaller common denominator? Is there any aller? Can you reduce $\frac{1}{2}$ and $\frac{1}{3}$ to fifths? (Teacher will here, course, disregard fractions having fractional numerators.) To urths? To thirds? Why can't we reduce $\frac{1}{2}$ and $\frac{1}{3}$ to fifths, fourths, thirds? (Obtain answer: Fractions are reduced to higher terms multiplication, and $\frac{1}{2}$ and $\frac{1}{3}$ cannot be multiplied to produce ths, fourths, or thirds in common. In other words, neither 5, r 4, nor 3 is a common multiple of the denominators.) Why can we reduce ½ and ⅓ to sixths? Because 6 is a common multiple of both denominators? Can we reduce ½ and ⅓ to sevenths? To eighths? To ninths? To tenths? To elevenths? To twelfths? To what common denominators can we reduce ½ and ⅓? (Obtain answer: To any denominator that is a common multiple of 2 and 3.)

Let us consider ⅓ and ¼. Reduce them to twelfths, to twenty-fourths, and to forty-eighths. Are there any other denominators to which ⅓ and ¼ may be reduced? Is there any common denominator less than 12? Why not? (Obtain answer: Because 12 is the least common multiple of 3 and 4.)

Let us return to ⅓, ¼, and ⅙. (Treat similarly, adding as follows:) How then shall we find the least common denominator of ⅓, ¼, and ⅙? How do we find the least common multiple? (See lessons on *Least Common Multiple.*)

Application: Reduce $\frac{2}{3}$, $\frac{3}{4}$ and $\frac{5}{6}$ to a common denominator. Also $\frac{1}{2}$, $\frac{3}{4}$, and $\frac{5}{8}$. Also $\frac{5}{6}$, $\frac{5}{8}$, and $\frac{3}{4}$. Also $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{5}{6}$, $\frac{7}{8}$.

Add any two of the fractions in the last example. Find the difference between any two of them. Find the sum of the first three; of all of them. Subtract $\frac{7}{8}$ from the sum; $\frac{5}{6}$ from the remainder, etc.

Summary of Argument: Fractions may be reduced to higher terms. These fractions (*i. e.*, ½, ⅓, ¼, etc.), may be reduced to fractions having the same denominator and are then said to be reduced to a common denominator. This common denominator is always a common multiple of the original denominators and the least common denominator is always the least common multiple of the original denominators. Since common multiples to any set of numbers may be found, common denominators may be found for any set of fractions. Special methods to find the least common multiple and the least common denominator should come *after* the method by inspection has been learned.

Note. The treatment given is purely arithmetical, being free from illustrations with concrete objects. It rests on the conviction that in this topic at least the real objects of thought should be the arithmetical quantities themselves, *i. e.*, number, not geometric magnitude or qualitative concepts. The introduction of the latter only impedes the progress of thought. While a show of reality may be given to such methods in dealing with very simple fractions whose concrete representations may be imaged, yet when the more difficult fractions are taken up a resort is inevitably made to methods purely arithmetical. The common measure of ½ and ⅓ may be imaged, but not that of $\frac{5}{6}$ and $\frac{4}{7}$. Again, teaching that the least common denominator of two or more fractions is the denominator of the fractional unit which is the greatest common measure of the given fractions should have no place in elementary arithmetic.

The Reduction of Fractions to Higher Terms.

By Emma Sylvester, Instructor, New York City.

THE reduction of easy common (and decimal) fractions " forms part of the work of the 4-B Grade. This very work in reduction, or changing the form, without changing the lue of the fractions, might be looked upon as elementary, fundaental, in the teaching of fractions. Children constantly need this owledge in all their subsequent work in arithmetic.

Therefore, it seems proper that reduction should be taught in B as soon as we are sure that the pupils have the idea "fraction " mly fixed in their minds; and they must also know the meaning such terms as proper fraction, improper fraction, mixed number.

In teaching the cases of reduction the writer has adopted the llowing order as the most logical one:

I. Integers to improper fractions.

II. Mixed numbers to improper fractions.

III. Conversely, — improper fractions to whole or mixed mbers.

IV. Higher terms, and conversely.

V. Lowest terms.

This paper is to deal especially with cases IV. and V.

In teaching reduction to higher and to lowest terms, we made e of the "fractions in series" taught in 4-A. Children can read- be led to understand what we mean by "lowest terms" and igher terms." "Which fraction do you understand best, $\frac{1}{3}$, $\frac{2}{6}$, $\frac{3}{9}$?" "Why?"

In cases IV. and V. we seek to discover the principle upon ich "fractions in series" is based. Children are encouraged to scover truth for themselves; they become self-reliant, and they in confidence in their own ability, to say nothing of the mental scipline resulting from their efforts.

Cases IV. and V. may readily be presented together.

Preparation. How many 2's in 4? in 6? in 8? How many 3's in 6? in 12? in 9? etc.

In $\frac{1}{2}$, how many 4ths? (using "fractions in series").

Presentation. Since $\frac{1}{2} = \frac{2}{4}$, how may we obtain the terms of $\frac{2}{4}$ from the fraction $\frac{1}{2}$?

What must I do with $\frac{1}{2}$ to obtain the fraction $\frac{2}{4}$? $\frac{4}{8}$ from $\frac{1}{2}$? etc.

The pupils very soon grasp the idea that to obtain $\frac{4}{8}$ from $\frac{1}{2}$ we must multiply *both* terms of $\frac{1}{2}$ by 4, etc.

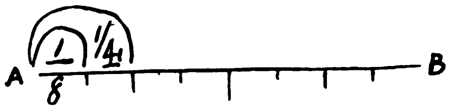
By means of a number of such short, simple examples, the class is led to deduce the principle that, multiplying *both* terms of a fraction by the same number does not alter the value of the fraction.

Then, the converse can be shown. To obtain $\frac{1}{2}$ from $\frac{4}{8}$ it is necessary to *divide* both terms of the fraction by 4. Thence we deduce the principle that *dividing* both terms of a fraction by the same number does not alter the value of the fraction.

Combining,—we say *multiplying* or *dividing both* terms of a fraction by the *same* number does not alter its value. This principle is an exceedingly important one, and we should make sure that it is thoroughly understood by the class.

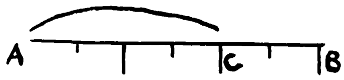
Ocular demonstration should be given, as a matter of course, by means of diagrams, cutting objects, cutting papers, strings, etc.

We should appeal in our work to as many of the senses as possible, so as to strengthen the impression made upon the child's mind.



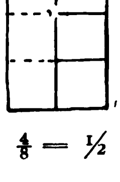
"What do we learn from this diagram?"

$\frac{1}{4} = \frac{2}{8}$
$\frac{1}{2} = \frac{4}{8}$
$\frac{3}{4} = \frac{6}{8}$, etc.

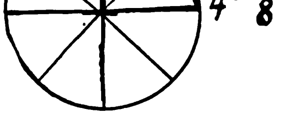


AC = $\frac{4}{6}$ or $\frac{2}{3}$ of AB.

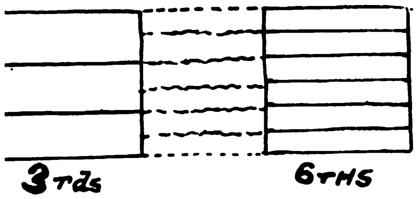
Rectangles and circles may also be used.



$\frac{4}{8} = \frac{1}{2}$



By means of such simple diagrams, etc. (with which all teachers are so familiar), fractions are also compared; and we learn, too, that the *greater* the number of parts into which the unit is divided the *smaller* the parts, and *vice versa*.



$\frac{1}{3}$ is twice as large as $\frac{1}{6}$; or
$\frac{1}{6}$ is $\frac{1}{2}$ as large as $\frac{1}{3}$.
$\frac{1}{3} = \frac{2}{6}$
$\frac{2}{6} = \frac{1}{3}$

Children are encouraged to invent new devices for illustrating is work. When the principle is thoroughly comprehended by all, e concrete work is dropped, and we ask such questions as:

"How many 4ths in $\$\frac{1}{2}$? in $\$\frac{3}{4}$?"

"How may I obtain $\frac{8}{10}$ from $\frac{4}{5}$?"

"Reduce $\frac{6}{10}$ to its latest terms. How shall I do this?"

"Change $\frac{3}{4}$ bu. to 8ths."

"Reduce $\frac{2}{3}$ to a fraction having 6 for its denominator." Vary e question-form as much as possible.

This work in reduction is important, as it prepares the way for e addition and subtraction of fractions.

A large part of our work is mental. Our aim is to secure curacy and rapidity in dealing with fractions in common use, ctions with small denominators. For this reason the examples ven are short, varied, practical.

Children are allowed to give original examples, to think up oblems for themselves. Here, again, is splendid opportunity for ental culture, correct expression, and the correlation of arithetic with the other subjects of the grade.

Reduction of Common Fractions to Decimals.

BY CHAS. E. ROSENTHAL, Instructor, New York City.

Q. Express three-tenths as a fraction, Jones? (He writes $\frac{3}{10}$).

Q. Can you express the same fraction in another way? (He writes three-tenths.)

Q. Can you express it in still another way? (Assuming that nobody knows how, I write .3 on the blackboard, and add that that is the *third* way.)

Q. In each of these fractions the unit has been divided into how many equal parts, John? A. The unit has been divided into ten equal parts.

Note. At this point I take up three parts of the ten into which a sheet of paper had been divided.

Q How many pieces have I in my hand? A. You have three pieces.

Q. Each piece is what part of the whole sheet? A. Each is one tenth of the sheet.

Q. Then the three pieces are what part of the whole sheet? A. The three pieces are three-tenths of the whole sheet.

Q. When we speak of a *part* of a unit, may we use some other word for *part?* A. You may use fraction instead.

Q. Again holding up the three pieces, what fraction of the entire sheet have I in my hand? A. You have three-tenths.

Note. At this point I sought to make clear the distinction between a *fraction* and a *common fraction.*

Q. What is a fraction? A. It is a *number* of *the equal parts* of unit.

Q. What is a common fraction? A. A common fraction is one in which the unit is divided into *any* number of equal parts.

Q. How do you express a common fraction? A. It is expressed by writing two numbers, one above the other, with a short line between them.

Q. Suppose I write $\frac{4\frac{1}{2}}{3}$ on the blackboard (doing so), will you call this a common fraction? A. It is a common fraction, because the two numbers are written one above the other with the short line between them.

Note. Now I shall endeavor to show the difference between a common and a decimal fraction.

I take up the three pieces already referred to and proceed as follows:

Q. What fraction of the whole sheet have I now in my hand? (holding up one-tenth). A. You have one-tenth.

Q. Suppose I cut this one-tenth into ten equal parts, what fraction of the whole sheet will one of these new pieces be? A. It will be $\frac{1}{100}$ of the whole sheet.

Q. Now suppose I cut one of the pieces which is $\frac{1}{100}$ of the entire sheet into ten equal parts, what fraction of the whole sheet will one of these tiny pieces be? A. It will be $\frac{1}{1000}$ of the entire sheet.

Note. The fractional units $\frac{1}{100}$ and $\frac{1}{1000}$ may require further questioning in order to show how they were obtained.

Q. When a unit is divided into tenths, hundredths, thousandths, etc., and I wish to express these fractional units, how may I do so? A. You may do so by common fractions or by words.

Q. But I do not wish to have them expressed either by common fractions or by words? A. I assume he does not know.

Q. Suppose I wish to express one-tenth not as a common fraction, how may I do so? A. You may do so by writing the figure one after a point, thus .1.

Q. Is this .1 a fraction? A. It is.

Q. What kind of a fraction is it? A. It is called a decimal fraction.

Q. Why is this called a decimal fraction? A. It is called a decimal fraction because the symbol of a decimal is used.

Q. What is that symbol? A. It is the period.

Q. What is this period called? A. It is called the decimal point.

Note. If the teacher desire, he can at this point introduce the historical information concerning the decimal point. It can be found in Brook's Union Arithmetic.

Q. Suppose I wish to express one-hundredth decimally, how shall I do it? A. By writing it thus, .01.

Q. How shall I express $\frac{1}{1000}$ decimally? A. By writing it thus, .001, etc., etc.

Q. What kind of a fraction is .001? A. It is a decimal fraction.

Q. Has it a denominator? A. It has.

Q. Is it expressed? A. It is not.

Q. Is there anything to indicate it? A. The decimal point indicates it.

Q. Does the decimal point do anything else besides indicate the denominator? A. It separates the decimal from the whole number.

Q. Now, can you tell me what is the difference between a common and a decimal fraction? A. A common fraction may have any number for a denominator, but a decimal fraction must have 10 or some power of 10. In a common fraction the numerator and the denominator are expressed, but in a decimal fraction the numerator only is expressed, the denominator being understood.

Note. The word *power* may need explanation, which can be easily given.

Now, I can reduce a decimal to a common fraction, and a common fraction to a decimal.

Let us take the common fraction $\frac{5}{8}$.

Q. Multiply $\frac{5}{8}$ by $\frac{10}{10}$; what result do you get? A. I have $\frac{50}{80}$.

Q. Have you changed the value of $\frac{5}{8}$? A. I have not changed the value.

Q. Multiply $\frac{5}{8}$ by $\frac{100}{100}$; what result do you get? A. I get $\frac{500}{800}$.

Q. Multiply $\frac{5}{8}$ by $\frac{1000}{1000}$, what result? A. I get $\frac{5000}{8000}$.

Q. In either case have you changed the value? A. I have not.

Q. What principle of common fractions do you learn from these examples? A. That when the numerator and denominator of a fraction are multiplied by the same number the value of the fraction is unchanged.

Q. Suppose I take the last fraction, $\frac{5000}{8000}$. Divide 5000 by 8, what result will you get? A. I will get 625.

Q. Divide 8000 by 8, what will be the result? A. The result will be 1000.

Q. Then dividing both the numerator and the denominator of the fraction $\frac{5000}{8000}$ by 8, equals what? A. The result will be $\frac{625}{1000}$.

Q. Can you express $\frac{625}{1000}$ as a decimal fraction? A. I can; decimally it is expressed as follows: .625.

Q. By dividing both numerator and denominator of a fraction by the same number, what principle of common fractions do you learn? A. That the value of the fraction remains unchanged.

Note. Here call attention to the fact that when the numerator and the denominator of the original fraction have been multiplied by some power of 10, that the *new* numerator and the *new* denominator must always be divided by the denominator of the original fraction in order to get a resulting fraction whose denominator shall be 10 or some power of 10.

Cancellation.

By Edward D. Stryker, Instructor, New York.

ANCELLATION is defined as the process of casting out equal factors from the dividend and the divisor, and it is based upon the principle that dividing the divisor and the dividend by the ne number does not alter the quotient. This can be related to reduction of vulgar fractions, the principle here being that ltiplying or dividing both terms by the same number does not r the value of the fraction. Care should be taken not to allow child to think that this process of cancellation is only applicable he reduction and multiplication of fractions, but he should be ressed with the fact that it is of great use in all problems in ch multiplication and division occur. The average scholar in sixth and seventh years will always solve a problem involving ltiplication of fractions by cancellation; but when he is asked to ly the same principle to problems of denominate numbers, per-tage, interest or proportions he seems utterly at a loss to know at is meant. He will always write his fractions separately, thus:

$$\frac{4}{5}\times\frac{5}{6}\times\frac{21}{32}=$$

if he is asked to state, say,

$$35\times 15\div 25$$

this fashion: $\frac{35\times 15}{25}$ he knows almost nothing about it; and e out of ten boys in 7-A class cannot read it at all. If in the inning of his work in the reduction of fractions he is required resolve each term into its factors, and write the factors above below the line which signifies a division, this state of affairs ht be avoided. The present course of study in arithmetic for hattan and the Bronx has nothing to say specifically about the hing of factors, divisors or multiples; but it is fair to assume t these must be taught before the child can handle fractions to advantage. It would seem, therefore, that cancellation might commenced in 4-A, instead of being left until 5-A, when the il has reduced fractions to higher and lower terms, and has had mples in addition and subtraction of fractions.

For example, in a first lesson we are to reduce $\frac{6}{8}$ to lower terms: $6=3\times2$ and $8=4\times2$ $\frac{6}{8}=\frac{3\times\cancel{2}}{4\times\cancel{2}}=\frac{3}{4}$. Then show objectively that $\frac{6}{8}$ is really equal to $\frac{3}{4}$. This is a very important step. Similarly, reduce $\frac{10}{12}$, $\frac{14}{21}$, $\frac{18}{24}$, and so on, gradually increasing the numerical value of numerator and denominator.

In this same grade (4-A) the pupil is to be drilled in combinations of two or more rules. Having shown the principle of cancellation by its use in the reduction of fractions to lower terms, the next step is to apply it to his drill in combinations of multiplication and division.

Dictate the following: Multiply 23 by 10 and divide the product by 5. This must be stated upon the board or upon paper by the use of signs only, and appear in this form:

$$\frac{23\times10}{5}$$

Now the numerator must be factored. 23 has no factors; 10 is equal to 5×2. Second statement is therefore:

$$\frac{23\times5\times2}{5}$$

Now the striking out of the equal factors above and below the line of division will leave a very simple operation to be performed:

Thus: $$\frac{23\times\cancel{5}\times2}{\cancel{5}}=23\times2=46.$$

This result must be proved to be correct by working out the example by the longer methods, and the child drilled in similar examples, always verifying his work. After awhile he will be willing to accept the result as true without question.

In the next step of the work comes the application to general problems.

I sold 23 tables at $10 each, and with the money bought chairs at $5 each; how many chairs did I buy? This *must* be stated, as before, using figures and signs, thus:

$$\frac{23\times10}{5}$$

Now the pupils are ready for this solution $\frac{23\times\overset{2}{\cancel{10}}}{\cancel{5}}=46$ chairs.

Bring in here the principle that when dividend and divisor a like numbers, the quotient is an abstract number. The exampl must be quite simple and the numbers so related as to suggest li factors, or that one number shall be a multiple of the other. the child advances in age and capacity he will solve such examp by paying attention only to the ratio of the prices, with scarcely a effort, and without any technical knowledge of ratio.

The only difficulty in the solution of any problem lies in the statement of the processes involved and their sequence. If the pupil, at least as soon as he enters the 4-A grade, is required to *state* every problem, and give a reason for each step in the work, his life in the upper grades will be much pleasanter and his progress in all branches of study which call for an exercise of his reasoning powers greatly facilitated.

Probably cancellation has its widest application in the multiplication of fractions. This use of the process may easily be taught by identifying it with the reduction of fractions to lowest terms. Thus:

$$\frac{4}{15} \times \frac{9}{10} = \frac{4}{10} \times \frac{9}{15} = \frac{2}{5} \times \frac{3}{5} = \frac{6}{25}$$

Similarly:

$$\frac{5}{8} \times \frac{18}{25} \times \frac{4}{9} = \frac{5}{25} \times \frac{18}{9} \times \frac{4}{8} = \frac{1}{5} \times \frac{2}{1} \times \frac{1}{2} = \frac{1}{5} \times \frac{2}{2} \times \frac{1}{1} = \frac{1}{5}$$

Once the principle is demonstrated that the denominators may be interchanged without affecting the product, the process of cancellation becomes the reduction of fractions to lowest terms.

The interchange of denominator (or of numerator) may be imaged without explicit statement, thus giving the process its usual form:

$$\frac{\overset{3}{\cancel{6}}}{\underset{5}{\cancel{25}}} \times \frac{\overset{3}{\cancel{15}}}{\underset{8}{\cancel{16}}} \times \frac{7}{\underset{3}{\cancel{9}}} = \frac{7}{40}$$

A recurrence to the explicit statement will always remove any perplexity. Thus a mechanical process which too frequently is enveloped in mystery and obscurity, becomes, in the minds of pupils, a mere modification of a familiar exercise.

The Multiplication of a Fraction by a Fraction.

By I. Edwin Goldwasser, Instructor, New York City.

IF the more complicated processes involving the use of fractions are to be grasped by the pupils, not as mere dictation exercises, but as practical things actually apprehended, there must be a firm foundation laid through a proper teaching of the nature of the fraction. In all rational dealings with fractions two conceptions are fundamental: first, that of the fraction as representing what part one number is of another, and second, the conception of a fraction as a means of representing to the eye, the division of a unit into parts. The denominator should be treated altogether as a name, but the pupils should be shown by concrete illustrations that it *is* a name because it represents *the size of the parts.* This idea of size is conveyed by the denominator because it shows the *number* of equal parts into which the unit has been divided. These two conceptions of the denominator are fundamental. This lesson assumes that the addition and the subtraction of fractions have been taught; so also with all the steps that lead up to, and include the process of multiplying a mixed number by an integer.

First Lesson. To find ½ of ½, of ⅓, etc. The multiplication of fractions is nothing but finding what part one fraction is of another, and all problems must be reduced to this form before they can become intelligible. All directions here given are to be given to the pupils; answers are inserted only where they are needed to show the development of method.

John, step to the board and draw a rectangle which we can call a unit. Divide this into two equal parts. (Fig. 1). Call one of these parts by some letter. Read what you have. (A is one half of a unit.) Write this on the board. John writes "½." William, step to the board and divide A into two equal parts. Call each part by some letter. (Fig. 2.) Read what you have. (B is one half of A.) That is very good; now who will tell us in some other way what B is? (B is one half of one half of a unit.) Henry, step to the board, and tell us in writing what B is. (Pupil writes "½ of ½ is equal to B.")

FIG. 1.

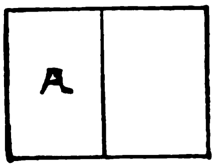
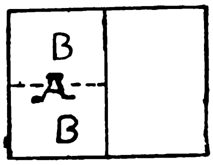


FIG. 2.



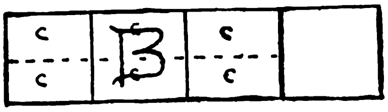
How many B's are there in the unit? How do you know that there are four B's in the unit? What part of a unit is B? What is one half of one half equal to? Thomas, write that statement on the board. Which is greater, ½, or ¼? Why is ½ greater than a quarter? How many times ¼ is ½? What part of ½ is ¼?

The diagram to illustrate the questions that follow is similar to Figure 1, and is not here reproduced. Draw on the board another unit. Divide it into two equal parts. Divide A into three equal parts. Who will tell us what we have done? (We have found ⅓ of ½ of a unit.) How many of these parts are there in a unit? What part of the unit is each of these? What is ⅓ of ½ equal to? Write this on the board. How many sixths are there in ½? (Each pupil should have small pieces of paper and, with the aid of scissors, each should cut the unit for himself, and thus see the relation of the parts to one another, concretely.) The teacher should *immediately* have the pupils work out this problem, concretely: What is ½ of ⅓? Its identity with the preceding should be noted and commented upon. Now, when we wished to find ½ of ⅓, what did we do to the denominator 3? (If the pupils be given a little time, they will see that to divide the denominator into 2 equal parts, we have multiplied by 2 the *number* of equal parts into which the unit is divided. For this we need the "deaf and dumb teacher.")

A woman had 20 apples. She sold ½ of them, and gave away ½ of those she had left. How many did she give away? Two methods. First: ½ of 20, and then ½ of 10. Second: ½ of ½ is ¼; ¼ of 20 is 5. Other problems: money spent, a fraction of the remainder lost—how much lost? Boys and girls in a class; ⅓ are boys; ½ of the boys had a problem right. How many? The teacher may vary the wording to suit her requirements.

SECOND LESSON: To find ½ of ¾ or ¾ of ½. Draw a unit on the board. Divide it into 4 equal parts. Mark off by heavy lines ¾ of the unit. Divide this part B into two equal parts. (Fig. 3.) Who will tell us what we have done? (We have found one-half of three quarters.)

FIG. 3.



Call each small part C. How many C's are there in ¼? How many are there in the unit? What part of a unit is C? How many C's are there in B? How many C's are there in ½ of B? Who will tell the class what ½ of ¾ equals? (½ of ¾ is equal to ⅜.) Write this statement on the board. In a similar way have the pupils find ¾ of ½ and point out the identity of the result. The pupils should now work out on the board problems of their own invention, without instructions from the teacher, and should be called upon to make the entire explanations without help. Have the results written one under the other at one side of the board. What have we done to the denominators in all these problems?

What is ¼ of ½? How many times ¼ are ¾? Who will tell the class another way of saying ¾ of ½? (¾ of ½ is the same as 3 times ¼ of ½.) Illustrative problems of the kind already indicated. Always have the pupils give the arbitrary form of the problem either after or before analysis. Thus: A man had 60 sheep; he divided them into 4 flocks and gave 3 flocks in charge of his dog. How many sheep did the dog have charge of? "This problem may read: What is ¾ of 60?" Then comes the analysis. Have the pupils on one side of the room ask questions dealing with abstract numbers of those on the opposite side; the one called on may in turn ask a question of a pupil on the first side, and this may be kept up for a long time before interest gives out. More advanced problems are of this type: A bank has on hand $800, of which ¾ is gold, and the rest silver. ⅖ of the silver is in quarters. How many quarters are there? "The number of quarters will be 4 times ⅖ of ¼ of $800." Then will follow the detailed analysis, or the process may be reversed.

THIRD LESSON: To find ⅚ of ¾ or ¾ of ⅚. As a review, have the pupils give a large number of problems that fall under the principles already developed, and have them written on the board. What is the denominator of the first answer? What are the denominators of the multiplier and the multiplicand that gave this product? So with the second, third, etc. Can any one tell the class how to find out from the denominators of the two fractions given, what will be the denominator of the product? Who will state this in the form of a rule? "The denominators of the multiplier, and multiplicand, if multiplied, will give the denominator of the product.

In the following lesson, each pupil should be furnished with paper and ruler, that he may follow the steps as performed by individual members of the class at the board.

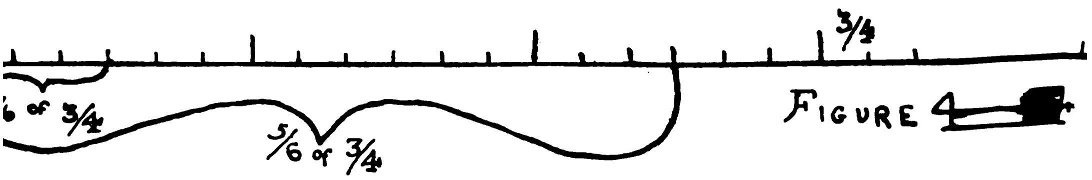


Figure 4

We are going to find ⅚ of ¾. Draw on the board a long line that will stand for a unit. Find ¾ of this line. What will be the denominator of our answer? Into how many equal parts will the unit be divided in the product? How many 24ths are there in a it? How many 24ths are there in ¼ of a unit? Divide the ¾ o 24ths. How many 24ths are there in ¾? (Reference is now be made to figure 4.) What is ⅙ of ¾? Mark it off. What is f ¾? Mark off ⅚ of ¾. Make these steps just as indicated, and he jump be too great, then ask for $\frac{2}{6}$, $\frac{3}{6}$, $\frac{4}{6}$, and ⅚ of ¾. Who will d the answer? (⅚ of ¾ is equal to $\frac{15}{24}$.) Write this statement on board. Have other problems, and in each case show practically t the multiplier and the multiplicand may be interchanged. Now urn to the original. What is the numerator of the product? w did we get the 15? Why did we multiply 5 by 3? (Because of ¾ is $\frac{3}{24}$, and ⅚ of ¾ is 5 times ⅙ of ¾ or $\frac{15}{24}$.) A similar cess with the other problems. Who will now tell us how to find numerator of the product? How did we find the denominator the product? Who will put these two rules together, and give a rule for multiplying one fraction by another? Drill and practi- problems of the types already indicated.

Division of a Fraction by a Fraction.

By Bernard J. Devlin, Instructor, New York City.

BY means of fraction-box or other device, the children have previously learned the division of a fraction by a whole number. The lesson to be taught may then be regarded as made up of two steps: division of a whole number by a fraction; division of a fraction by a fraction.

Recall to the class the fact that the reciprocal of a number is the relation which exists between a part of the unit and the unit itself, when the latter has been divided by the number, thus: ⅓, the reciprocal of 3, expresses the relation of one part to the three parts into which the unit has been divided. So 3 is the reciprocal of ⅓, or the relation of the divided unit to one of the parts. The statement of the aim of the new lesson may then be made somewhat as follows: We have seen that when we divide a fraction by a whole number, we really multiply by the reciprocal of the number. Now, let us see what is to be done when our divisor is a fraction instead of a whole number.

By use of a dollar in dimes, fraction-box, line or circle divided into ten equal parts, recall the facts and place on the board $1 \div 10 = \frac{1}{10}$. Question until the relations between the parts and the unit are clearly perceived. What part of a dollar is 1 dime? What part of the circle is this section? etc. What is one dime? How many dimes in a dollar? etc.

Have children answer $1 \div \frac{1}{10} = 10$. What will $2 \div \frac{1}{10}$ be? 20. $3 \div \frac{1}{10}$? 30., etc. Then by use of days of week for sevenths, clock-face for twelfths, or any other device that may occur to the teacher, go through the same steps with other fractions.

The children will now be ready to infer that they obtained their answers by multiplying the dividend by the denominator of the divisor. That this may be clear, question as to which is the dividend, divisor, denominator, etc. The following questions may suggest the inference:

How did you know there were 20 parts in 2 units divided into tenths? 14 parts in 2 units divided into sevenths? In this division example, what name is given to 2? To 10? Using the terms divilend, denominator of divisor, etc., can you now tell me how to get he answer to $2 \div \frac{1}{10}$, $3 \div \frac{1}{10}$, or to any whole number divided by a raction? Multiply the dividend by the denominator of the divisor.

The second portion of this step will take up fractional divisors vith numerators other than unity.

Review: How many dimes in a dollar? What part is 1 dime? dimes? Etc.

How many times will 2 dimes, or $\frac{2}{10}$, of a dollar be contained n one dollar? 5. Express this with division sign. $1 \div \frac{2}{10} = 5$. Vhen we divided 1 by $\frac{1}{10}$, what was done? The dividend was reluced to the same denomination as the divisor. In $1 \div \frac{2}{10}$, what do ou suggest? Reduce the dividend to the same denomination. Do o. $\frac{10}{10} \div \frac{2}{10}$.

How many times are 2 apples contained in 10 apples? 2 dolars in 10 dollars? 2 tenths in 10 tenths? In each of these exmples, name the dividend; the divisor. Are the names necessary or the answer?

Divide 1 by $\frac{2}{10}$ and reject the name of the parts. $10 \div 2 = 5$. 2 y $\frac{2}{10}$. $20 \div 2 = 10$. 3 by $\frac{2}{10}$. $30 \div 2 = 15$. (When the children ave gone far enough with one fraction as a divisor, perform the me steps with other fractions. Have the class compare the work these examples, and they will then be ready, after a little quesoning on the part of the teacher, to make the following statement: have multiplied the dividend by the denominator of the divisor nd divided by the numerator.)

Divide 4 by $\frac{2}{7}$ and express the operation by means of signs. $4 \times$ $\div 2$. What is the answer? 14. (The teacher may have to show at this is the same as $4 \times \frac{7}{2}$. Let other examples of this kind be iven and then proceed to comparison.)

Compare $4 \times \frac{7}{2}$ with $4 \div \frac{2}{7}$. What about the signs? The divisor? tate what was done in order to get the answer. (The class will robably say that the dividend has been multiplied by the divisor, rned upside down.) The teacher will then give the word *inverted* nd bid them say what is done when the divisor is a fraction. The nswers will be nearly perfect, but may need as a supplement the atement of the teacher: To divide by a fraction, invert the diisor and multiply.

The second step of the lesson is the division of a fraction by a raction. The pupils have been previously drilled in multiplication f fractions and this step in the division is scarcely an advance. As oth dividend and divisor are fractions some questioning may be ecessary to determine clearly which is the divisor. Then the rule vill operate and the work be performed as in previous examples in nultiplication of fractions.

However, if a clearer understanding of the division of a fraction by a fraction be deemed advisable, the following outline may be suggestive of the step to be pursued.

How many times is $\frac{1}{4}$ contained in $\frac{2}{4}$? $\frac{2}{8}$ in $\frac{6}{8}$? $\frac{3}{25}$ in $\frac{21}{25}$? Express these examples with the division sign and write answers.

Can you divide $\frac{1}{3}$ by $\frac{1}{12}$? What change must be made? Here is a gallon measure and here a quart dipper. The gallon measure will contain how many dipperfuls of water? The ruler is 12 inches; the board is 1 yard high; how many times is the length of the ruler contained in the height of the board? What is this? A dollar. If each boy receives 5 cents, how many boys will receive money?

What change was necessary in the gallon before you obtained the answer? In the height of the board? In the dollar?

Divide 1 third by 1 twelfth. What change is necessary? Make the change. $\frac{1}{3}=\frac{4}{12}$. $\frac{4}{12}\div\frac{1}{12}=4$. What change must be made in dividing $\frac{1}{2}$ by $\frac{1}{5}$? They must be changed to fractions with like names or denominators. Express the division with this change, and I will write the example on the board. 5 tenths ÷ 2 tenths. Can you tell the answer? How many times are 2 apples contained in 5 apples? What figure is the divisor? The dividend? Is the name, apples, necessary for the answer? In 5 tenths ÷ 2 tenths, what figure is the divisor? The dividend? Is the name, tenths, necessary? What is the answer? $2\frac{1}{2}$.

Let us see what was done in each of these examples. In the first, the denominator of one fraction was made to correspond to the denominator of the other. Was the value of this fraction changed? No. We changed the numerator to correspond to the new denominator. In the second example we found a common fractional unit, $\frac{1}{10}$, and reduced each fraction in terms of this, so that both had then the same denominator. Did we need the new denominators in the division? No, they were disregarded. What parts of the division did the numerators become? The divisor and dividend. Can you make a rule which will enable us to divide a fraction by a fraction?

Reduce the fractions to a common denominator, reject the denominator, and divide by the numerators as whole numbers.

If the rule for the inversion of the divisor is desired, we shall have to carry the lesson through some additional steps. The relations between a number or a fraction and its reciprocal must be clearly understood. Referring to the example above, $\frac{1}{3}\div\frac{1}{12}$, we ask: $\frac{1}{3}\div 1=$? $\frac{1}{3}$. What is the relation between 1 and $\frac{1}{12}$? 1 is 12 times as large as $\frac{1}{12}$. In these two examples $\frac{1}{3}\div 1=$?, and $\frac{1}{3}\div\frac{1}{12}=$?, which answer will be larger? Can you tell what the relation will be between these two answers? The answer in the second will be 12 times as large as the answer in the first, because the divisor is only $\frac{1}{12}$ as great. What is the answer to the first? $\frac{1}{3}$. What must be the answer to the second? $\frac{1}{3}\times\frac{12}{1}=4$.

Divide $\frac{2}{3}$ by $\frac{3}{5}$. $\frac{2}{3}\div 1=$? $\frac{2}{3}$. $\frac{2}{3}\div\frac{1}{5}=$? $\frac{2}{3}\times 5$.

If $\frac{2}{3}\div\frac{1}{5}$ equals a certain answer, will $\frac{2}{3}\div\frac{3}{5}$ be greater or less? Less. State the relation between the two answers. The answer in the latter will be only $\frac{1}{3}$ as great as in the former because the divisor is three times as large. If then $\frac{2}{3}\div\frac{1}{5}=\frac{2}{3}\times 5$, express with signs $\frac{2}{3}\div\frac{3}{5}$. $\frac{2}{3}\times\frac{5}{3}$. What is the answer! $\frac{10}{9}$ or $1\frac{1}{9}$.

In each case compare the expression of the work just before the answer was obtained with the expression of the example as given. What changes were made to enable you to get the answers? Were your answers changed in any way from what they were when you obtained them by reducing the fractions to a common denominator? Using the word invert, can you now give me another rule for dividing a fraction by a fraction?

To divide a fraction by a fraction, invert the divisor and multiply.

The Multiplication of a Decimal by a Decimal.

By CHAS. W. LYONS, Associate Superintendent, Brooklyn.

THE following steps lead up to an understanding of the process of multiplying decimals:

1. Repeated drill in writing decimals accompanied by equal common fractions (e. g. $\frac{27}{100} = .27$), emphasizing the fact that the number of zeros in the denominator of the common fraction equals the number of decimal places in the decimal, and *vice versa*.

2. Development of the principle that in multiplying decimal whole numbers (e. g. 1000 by 100) the number of zeros in the product equals the number in the multiplicand plus the number in the multiplier.

3. The application of the preceding principle to the *denominators* of common fractions (e. g. $\frac{7}{10} \times \frac{13}{100}$).

4. The application of this last step to the fact emphasized in step 1.

Some of the details of the method are as follows: In step 1, there should be variety of expression (e. g. $\frac{13}{1000} = .013$ and the reverse form $.013 = \frac{13}{1000}$); also the use of the improper fraction $5.3 = 5\frac{3}{10} = \frac{53}{10}$, this also written in reverse form.

Step 2 deals with the development of a general law. It is an example of mathematical application to elementary pupils. The importance of this form of exercise may justify a concrete illustration:

You may go to the board and multiply 10 by 10, John Smith. Number your example 1. 100 by 10, Henry, No. 2. 10 by 100, Frederick, No. 3. 1000 by 10, William, No. 4. 10 by 1000, George, No. 5. 1000 by 100, Frank, No. 6. 100 by 1,000, Michael, No. 7. 1,000 by 1,000, Samuel, No. 8. 10,000 by 100,000, Albert, No. 9.

You may go to the board, James. Point to the product of the 3d example; the multiplicand of the 8th; the multiplier of the 6th.

How many zeros in the multiplicand of the first? Francis. In the multiplier? In the product?

How many zeros in the multiplicand of the second? Moses. In the multiplier? In the product?

Tell me the same thing about the third, Cecil. About the rth, Jacob. About the fifth, Fritz. About the sixth, Antonio. out the seventh, Solomon. About the eighth, Patrick. About e ninth, Pedro.

If there are 7 zeros in the multiplicand and 3 in the multiplier w many would the product have? John Bright.

Now, let all think and find the rule we go by. Find the rule d tell it well. (After a pause of 1 or 2 minutes.) How many ow? (Show of hands. Several pupils state the rule. Some pil who needs or deserves encouragement allowed to write his tement of rule on the board. Class copies the rule.)

If I multiply a number with six zeros by a number with four ros, how many zeros has the product? Edward.

A number with 8 zeros by one with three zeros? Adam. ove your answer.

A number with 10 zeros by one with four zeros? Gabriel.

What is the rule we go by? Gustav.

(Teacher then shows limitation of rule. Applies to 10, 100, 00, etc.)

The work in step (3) may take the following form:

Several pupils may be sent to the board with examples of the lowing type to be *stated* but *not* worked: $\frac{53}{100} \times \frac{7}{1000}$. A series questions should be asked concerning the number of zeros in the nominator of the product; then another series of questions about ding the numerator of the product.

In step 4 several examples of the following form should be *ted:* .7×.11. Then pupils should be questioned about the number zeros of equal common fractions in multiplicand, multiplier and oduct. Then about the number of decimal places in the equal cimal product. In this case, as in step 2, the conclusion reached om the individual examples will be the general law.

* * * * * * * *

The experienced and competent teacher will see, of course, at the method outlined above must not be crowded in presentaon. The steps suggested should be taken on successive days. fter a conclusion becomes definite it does not pay to linger. The lance of the recitation period should be spent on drill work or plication. Whenever the *live* interest of the class cannot be aintained there can be no success in the *rational* development any subject. The class must be *enthusiastically* attentive to secure ood reasoning.

This drill requires no originality and less intensity of effort, ut it brings facility in operation, and because it is a change in ctivity it is not irksome.

Now for the object of this discussion: It is to show the nature of true teaching in arithmetic; in fact, of all true teaching. Such teaching contains the two elements of *development* and *drill.*

Perhaps some experienced teacher, and in a limited way a successful teacher, may say, "I wouldn't bother with such nonsense. I just give my class a rule and have them learn it. Then I do the examples, and make the class do just as I do. They learn to multiply decimals all right." No doubt this is true, but when the element of rational development is considered the pupils learn not only how to multiply decimals, but also, what is worth more—that is, *how to think.* They get some training, in an elementary way, in the art of induction. The effect of such teaching is not shown in the abstract operation, but it becomes manifest when some degree of *independent* thought is required, e. g. in the solution of miscellaneous problems. The pupil rightly trained knows not only *how* to add, subtract, multiply and divide, but *when* and *why* to use each process.

A Lesson in Division of Decimals.

FRANK H. HALL. President, Illinois Institute for the Education of the Blind.

NOTE 1. The division of decimals may be conveniently con-lered under three heads or cases.

First. Problems in which the divisor is abstract and integral; e dividend, abstract or concrete but fractional: as, $\$12.6\div 3=?$ $.8\div 2=?$ $28.32\div 4=?$ Here the requirement is, to find one ird, one half, or one fourth of a number thought of as quantity or ıgnitude. The pupil encounters little difficulty in such problems these.

Second. Problems in which the divisor and dividend are to be ought of as like quantities one or both being fractional, and the quirement being to find how many times the divisor is contained the dividend: as, $\$12.6\div\$.3=?$ $\$12\div\$.3=?$

Third. Problems in which the divisor is abstract and fraction-, and the dividend concrete and either integral or fractional: as, $2.50\div 2.5=?$

The lesson given below refers entirely to problems that belong der the second of these heads or cases.

NOTE 2. Two brief reviews are necessary in order that the pil may easily relate the new to the old.

REVIEW NO. 1.

Teacher. Fill the blank in each of the following:

2.4 is —— tenths.
8 is —— tenths.
15 is —— tenths.
3.6 is —— tenths.
12.5 is —— tenths.
16.5 is —— tenths.

Teacher. Write 28 tenths in figures using the decimal point ead of writing the denominator. In a similar manner write, 35 ths; 90 tenths (9.0); 146 tenths; 234 tenths; 18 tenths; 50 tenths.

REVIEW NO. 2.

Teacher. The expression, $\$24\div\$2=?$, means what?

Pupil. It means tell how many times \$2 are contained in \$24.

Teacher. Tell how many times \$2 are contained in \$24.

Pupil. \$2 are contained in \$24 twelve times.

The teacher should now lead the pupil to interpret and to an-er each of the following in a similar manner, putting emphasis on the fact that in each case *the divisor and the dividend are like*

36 bu. ÷ 3 bu. = ?
32 qts. ÷ 4 qts. = ?
56 in. ÷ 7 in. = ?
6 tenths ÷ 2 tenths = ?
45 pecks ÷ 5 pecks = ?
42 cents ÷ 6 cents = ?
8 twelfths ÷ 3 twelfths = ?
12 fifths ÷ 3 fifths = ?

ADVANCE WORK.

2.4 ÷ .4 = ?

Teacher. What does this expression mean?

Pupil. It means tell how many times 4 *tenths* are contained in 24 *tenths.*

Teacher. How many times are 4 *tenths* contained in 24 *tenths*?

Pupil. 4 *tenths* are contained in 24 *tenths* six times.

Pursue a similar course with each of the following:

3.6 ÷ .3 = ?
4.5 ÷ .9 = ?
2.4 ÷ .6 = ?
8 ÷ .4 = ?
7 ÷ .5 = ?
6 ÷ .2 = ?

NOTE 3. The foregoing is sufficient for a single lesson. On the following day the teacher may further test and exercise the pupil in seeing relation—in thinking—by requiring him to give problems or statements in which these number processes are given concrete application. Thus, the concrete statement for the first problem given above might be: If one book costs 3 tenths of a dollar, for 3.6 dollars twelve books can be purchased. For the second problem the statement might be: Eight acres of land being divided into lots of 4 tenths of an acre each, there are 20 lots.

Such work can well be done in Grade 4 and many weeks should pass, perhaps months, before the pupil is confronted with long problems in division of decimals. When the time for such work comes, the pointing off will not be difficult. If the child is required to divide 246.25 by .5, he may think of the problem as a requirement to find how many times 5 *tenths* are contained in 2462 *tenths.* This enables him to locate the decimal point with certainty. If the problem is, to divide 865 by 2.5, he may think of it as a requirement to find how many times 25 *tenths* are contained in 8650 *tenths.* Thinking the relation in this way it cannot be difficult for him to determine the place of the decimal point. But such figure work should not be crowded upon the pupil until he is ready for it; until he feels the need of it in the solution of real problems such as naturally confront him in his own thinking,—his own effort to see relation.

Percentage by the Method of Common Fractions.

By Francis M. Conboy, Instructor, New York City.

N beginning the study of percentage it is advisable not to use the per cent sign, but use 100ths in the common fraction form, as: $\frac{3}{100}$, $\frac{7}{100}$, $\frac{9}{100}$, $\frac{97}{100}$, etc. Thus you present to the child the ndamental principle of this branch of arithmetic.

In the following plan I have only used a few terms, such as lling price, cost, gain, etc., but all terms that apply to arithmetic ay and can be applied to all steps.

1st Step. Use fractions that cannot be reduced to lower terms, *g.*, $\frac{13}{100}$, $\frac{7}{100}$, $\frac{97}{100}$, etc. Form examples with this idea in view, and us impress the 100th on the mind of the child.

$\frac{13}{100}$ of \$75 = ?

Had \$90, spent $\frac{17}{100}$ of it.

In a school of 900, $\frac{83}{100}$ are present; how many are absent?

Have examples formed before lessons and have them cover all ssible practical applications.

After the 1st step has been thoroughly drilled proceed to 2nd, in which use fractions that can be reduced; do not the child to reduce them; let him find out for himself that uction shortens, in some cases, the work.

$\frac{12}{100}$, $\frac{14}{100}$, $\frac{44}{100}$, etc.

3rd Step. Use complex fractions:

$\frac{13\frac{1}{2}}{100}$, $\frac{17\frac{1}{4}}{100}$, $\frac{83\frac{3}{4}}{100}$

before, do not tell the child to change and reduce this form to proper fraction; here also, let him find that out for him- f ; and this discovery will greatly aid him in the 4th step.

Sometimes this complex form of the fraction is handier than t of the changed form.

Here is presented an excellent opportunity to drill in changing s form of fraction to the simple form.

$$\frac{19\frac{1}{4}}{100} = \frac{\frac{77}{4}}{100} \text{ or } \frac{\frac{77}{4}}{\substack{400\\4}} \text{ or } \frac{77}{400}$$

4th Step. Use the aliquot parts of 100 in the same manner, and with little or no teaching the child finds out for himself that

$$\frac{12\frac{1}{2}}{100} = \frac{1}{8}$$

$$\frac{16\frac{2}{3}}{100} = \frac{1}{6}$$

$$\frac{83\frac{1}{3}}{100} = \frac{5}{6} \text{ etc.}$$

5th Step. To find the number of 100ths one number is of another: keeping in mind step 1, form examples so as to get a denominator 100, e. g.:

Had $100, spent $13; 100ths spent?

Spent $87, left $13; 100ths left?

Sold for $119, gain $19; 100ths gain?

6th Step. Keeping in mind step two, 14 is what part of 50? Ans. in 100ths. 19 is what part of 25? Ans. in 100ths.

Spent 9¢., had left 41¢., 100th left?

Sold for 29¢., gained 4¢.; 100ths gain?

Here we have an opportunity to get to the 100ths in short order:

$$\frac{2 \mid 14}{2 \mid 50} = \frac{28}{100}; \quad \frac{4 \mid 19}{4 \mid 25} = \frac{76}{100};$$

$$\frac{2 \mid 9}{2 \mid 50} = \frac{18}{100}; \quad \frac{4 \mid 4}{4 \mid 25} = \frac{16}{100};$$

7th Step. Now, have the third step well in mind and form your problems.

Cost, $300, gain $17 by selling; 100th gain?

Sold, $923 and gain $23; 100th gain?

Sold for $591 and lost $9; 100th gain?

$$\frac{3 \mid 17}{3 \mid 300} = \frac{5\frac{2}{3}}{100}; \quad \frac{9 \mid 23}{9 \mid 900} = \frac{2\frac{5}{9}}{100};$$

$$\frac{6 \mid 9}{6 \mid 600} = \frac{1\frac{1}{2}}{100}.$$

8th Step. Do not forget the 4th step, and see what an excellent opportunity for fine drill work, which gives excellent mental practice and puts into use the aliquot parts of 100.

Had $12½, spent 5; 100ths spent?
Lost $2½, left 10; 100ths left?
Cost $37½, sold gain $9; 100ths gain?

$$\frac{8 \mid 5}{8 \mid 12\frac{1}{2}} = \frac{40}{100}; \quad \frac{8 \mid 10}{8 \mid 12\frac{1}{2}} = \frac{80}{100};$$

$$\frac{\frac{8}{3} \mid 9}{\frac{8}{3} \mid 37\frac{1}{2}} = \frac{24}{100}; \quad \frac{\frac{6}{5} \mid 7}{\frac{6}{5} \mid 83\frac{1}{3}} = \frac{8\frac{2}{7}}{100}, \text{ etc.}$$

9th Step. Keeping in mind 1st step, prepare work as follows:

39 is $\frac{13}{100}$ of what number?
34 is $\frac{17}{100}$ of what number?
58 is $\frac{17}{100}$ of what number?
94 is $\frac{47}{100}$ of what number?
291 is $\frac{97}{100}$ of what number?

10th Step. Remembering the 2d step:

$12 is $\frac{3}{50}$ my money; what is my money?
11 scholars absent, which is
$\frac{44}{100}$ of class, number in class, etc.

11th Step. With 3d step in mind:

$\frac{19\frac{1}{4}}{100}$ of my money is \$23; what is my money?

$\frac{72\frac{2}{3}}{100}$ of school is 872 scholars; how many scholars?

$\frac{13\frac{1}{2}}{100}$ gain=\$216 gain; what cost? Etc.

12th Step. Refer to 4th step.

$\frac{37\frac{1}{2}}{100}=60$; what is the number?

$\frac{87\frac{1}{2}}{100}=14$; what is the number?

$\frac{83\frac{1}{3}}{100}=10$; what is the number?

$\frac{16\frac{2}{3}}{100}=51$; what is the number?

For the following plan, which has assisted me greatly for the past twelve years, I am indebted to Mr. Hugh Carlisle, Principal of Public School No. 26, Manhattan.

This plan of work covering all steps will greatly assist the teacher in preparing problems.

Covering Steps 1, 2, 3, and 4.

	Given.		To find.
a	Cost and 100th gain		Gain
b	“ and 100th loss		Loss
c	“ and sell 100th (1+r)	a^1	Sell price
d	“ and sell 100ths (indirect)	b^1	Gain
e	“ and sell 100th (1−r)	a^1	Sell price
f	“ and sell 100ths (indirect)	b^1	Loss
g	“ and 100ths gain		Selling price
h	“ and 100ths loss		Selling price
i	“ 100th gain 100 and more		Gain
j	“ sell 100th 200 and more	(a^1)	Sell price
	indirect	(b^1)	Gain

Covering Steps 5, 6, 7, and 8.

	Given.			To find.
a	Gain	Cost		100th gain
b	Loss	Cost		100th loss
c	Sell price	Cost	a^1	Sell 100ths
d	Profitable proceeds		b^1	100ths gain
e	Sell price		a^1	Sell 100ths
f	Unprofitable proceeds		b^1	100ths loss
g	Gain greater than cost—cost			100ths gain
h	Sell price twice cost and up cost		*a*	Sell 100ths
i			*b*	100ths of gain
j	Gain Sell price (indirect)			100ths of gain
k	Loss Sell price (indirect)			100ths of loss
l	Sell price—cost (with add. expenses)			100ths gain
m	Sell price—cost (with add. expenses)			100ths loss

Examples with terms unnecessary for the essential operation, e. g.: Sold 900 yds. cloth at \$2.87½ yd.; what 100ths gain if they had cost \$1.50?

Covering Steps 9, 10, 11, and 12.

Given.	*To find.*
Gain and 100th gain	Cost
Loss and 100th loss	Cost
Sell price and (profitable proceeds)	
Sell 100th $(1+r)$	Cost
Sell price and unprofitable proceeds)	Cost
and sell 100th $(1-r)$	Cost
and 100th loss	Cost
Gain (greater than cost) and 100ths gain	Cost
Sell price twice cost and up	Cost
and sell 100th or 100th gain	Cost
Gain indirect and 100th gain	Sell. price
Loss indirect 100ths loss	Sell. price
Sell. price indirect 100ths gain	Gain
Sell. price indirect 100ths loss	Loss

Percentage by the Method of Decimals.

By Lambert L. Jackson, State Normal School, Brockport, N. Y.

Preface.

THE object of this lesson is to present the so-called second case of percentage: One number is what per cent. of another? It is therefore assumed that the term per cent. has been taught, and the first case of percentage has been presented by the method of common fractions. Such facts as: 25% of a number is ¼ of the number, 33⅓% of a number is ⅓ of the number are regarded as already known to the pupil. The questions and answers are typical rather than unique, and their number is maximum. The amount of questioning required to establish each part of the lesson must depend somewhat on the proficiency and interested attention of the class.

Ppeparation.

Teacher. The work of to-day will not only lead to the solution of a new problem of percentage, but it will also give us a new view of the subject.

Q. ½ equals how many fourths? A. ½ equals $\frac{2}{4}$.

Q. ⅓ equals how many ninths? A. ⅓ equals $\frac{3}{9}$.

Q. $\frac{6}{10}$ equals how many fifths? A. $\frac{6}{10}$ equals $\frac{3}{5}$.

Q. How is a fraction changed to an equal one of given denominator? A. Multiply or divide both terms of the given fraction by a number which will change its denominator into the given denominator.

Q. ⅓ equals how many hundredths? A. ⅓ equals $\frac{33\,1\text{-}3}{100}$.

Q. $\frac{2}{5}$ equals how many hundredths? A. $\frac{2}{5}$ equals $\frac{40}{100}$.

50% is the same as what common fraction? A. 50% is the same as ½.

Q. 50% is how many hundredths? A. 50% is $\frac{50}{100}$.

Q. In what three ways may $\frac{50}{100}$ be written? A. (Written) $\frac{50}{100}$, 0.50, 50%.

Q. What are the three corresponding ways of writing ⅔? A. ⅔, 0.66⅔, 66⅔%.

Q. Any fraction? A. As a common fraction, as a decimal fraction, or with the symbol %.

Q. What is 75% of 80? A. 75% of 80 is ¾ of 80 or 60.

Q. If 25% of 80 is 20, 20 is what per cent. of 80? A. 20 is 25% of 80.

Teacher. The object of our work to-day is to express what per cent. one number is of another by the use of the decimal fraction.

Remarks: The preparation may appear long and undoubtedly would be for some classes; but on general principles when a lesson is too long, the *preparation* should be the last to suffer abridgment.

PRESENTATION.

The teacher writes on the blackboard:

Ex. I. 3 is what per cent. of 15? 1. 3 is what part of 15? 3 is $\frac{1}{5}$ of 15. 2 ∴ 3 is 0.20 of 15 or 20% of 15.

Ex. II. 60 is what per cent. of 40? 1. 60 is how many times 40? 60 is $\frac{3}{2}$ of 40. 2 ∴ 60 is 1.50 times 40 or 150% of 40.

Remark. It is safe to write these steps without questioning since the preparation has fully awakened the pupils' minds, and they will recognize the truth of each step immediately.

Ex. III. 20 is what per cent. of 30? 1. 20 is what part of 30? 20 is ⅔ of 30. 2. 20 is how many hundredths of 30? 20 is 0.66⅔ of 30. 3. Or 20 is what per cent. of 30? 20 is 66⅔% of 30.

COMPARISON AND GENERALIZATION.

Q. In step 1 of example 1, what question takes the place of "3 is what per cent. of 15?" A. 3 is what part of 15?

Q. In step 1 of example 2, what question takes the place of "60 is what per cent. of 40?" A. 60 is how many times 40?

Q. What is the first step in finding what per cent. one number is of another? A. Find what part the one is of the other or how many times the one is the other?

Q. What common fraction expresses this part in example 1? A. $\frac{1}{5}$.

Q. What common fraction expresses this in example 2? A. $\frac{3}{2}$.

Q. What common fraction expresses this in example 3? A. ⅔.

Q. How is step 2 in example 1 found from step 1? A. By changing $\frac{3}{2}$ to the decimal 1.50.

Q. What then is the second step in the process? A. Change the common fraction of the first step to a decimal fraction.

Q. What may replace 0.20 in step 2 of example 1? A. 20%.

Q. What then may replace 1.50 in step 2 of example 2? A. 150%.

Q. What then is the third step in the process? A. Substitute the per cent. sign for the decimal fraction.

Q. What are the three steps in the solution of such problems? A. (1) Express the relation of the one number to the other by a common fraction. (2) Express this common fraction as a decimal. (3) Substitute the other per cent. sign for this decimal form.

Application.

1. A man received $20 for making a sale of $60, what is his rate of commission?

Q. What part of the selling price did he receive? A. He received $\frac{1}{3}$.

Q. $\frac{1}{3}$ is what per cent? A. $33\frac{1}{3}\%$.

Q. What was the rate of commission? A. $33\frac{1}{3}\%$.

2. How much above cost must goods be marked so as to take off 5% and still make it 10% above cost?

Q. The selling price is what per cent. of the marked price? A. 95% of the marked price.

Q. The selling price is what per cent. of the cost? A. 110% of the cost.

Q. Then 95% of the marked price equals what per cent. of the cost? A. 95% of the marked price equals 110% of the cost.

Teacher. Write the statement using decimals. 0.95 of marked price=1.10 of cost. (Written.)

Q. The marked price equals how many hundredths of the cost? A. The marked price equals $\frac{1.10}{.90}$ or $1.22\frac{2}{9}$ of the cost.

Q. This is what per cent. above cost?

Teacher. This is a good exercise to illustrate that in all applications of percentage it is necessary for the sake of clearness to designate every per cent. as a per cent. of some definite thing.

The Teaching of Percentage by Equations.

By DAVID EUGENE SMITH, Principal of the State Normal School, Brockport, N. Y.

I. SPECIAL WORK PRESUPPOSED.

FROM the first grade oral work of the type, "Five times what number is forty?" Written work of the types, $5 \times (?) = 40$; $5 \times \$(?) = \$40$, the multiplier being written preferably first because (*a*) it is read first, (*b*) the numerical coefficient conventionally comes first in algebraic functions, (*c*) the German influence, now so prominent in American education, is generally on this side. Later, as in many of our best elementary arithmetics, the types $5x = 40$, $10 + 3x = 40$, $50 - 2x = 12$, should be met.

2. An understanding of the meaning of "per cent;" not the Latin meaning of ***per centum***, by the hundred, but the American meaning of "per cent." The pupil should know that

5 per cent means 5 hundredths,
1 " " " 1 hundredth,
½ " " " ½ of a hundredth,

and that therefore "per cent" means "hundredths," "hundredth" or "of a hundredth," depending on grammatical censiderations. The words "by the hundred" should never be presented to him in an arithmetic class; this is an interesting bit of etymology, but it is not arithmetic. [See Beman and Smith's Higher Arithmetic (Ginn), p. 126.]

3. An understanding of the symbols used in percentage. The class should understand that

five per cent, five hundredths, 0.05, $\frac{5}{100}$ and 5%

are all symbols and that all mean identically the same thing. The 5% is easiest written, the 0.05 appeals to the eye best in written calculations, but there is no more difference between them than between "Oct. 15" and "15th Oct." Each may be read "five per cent" or "five hundredths," and should be read each way by the teacher. The class should never be allowed to come to think that "5 per cent" and 5 hundredths," "5%" and "0.05," have any difference of meaning; to think otherwise is non-mathematical and unbusinesslike.

4. The four common operations with decimal fractions. These need not be carried out to any considerable extent. For suggestions as to these operations, in a work intended for more advanced students, see Beman and Smith's Higher Aritgmetic, p. 4-11. Also consult Smith's Teaching of Elementary Mathematics (Macmillan), p. 121.

II. AIM.

To take the first step towards leading the class to apply the simple equation to percentage, thus rendering useless all of the inherited rules and distinct "cases" of the subject.

III. LESSON PLAN.

1. *Preparation.* Questions of the following types: "Two times what number is twenty?" "In the primary grades we wrote this $2 \times (?) = 20$; how did we come to write it later?" ($2x = 20$.) "What name have we given to an expression of equality like $2x = 20$?" (Equation.) "If a pair of scales balances, and you add 1 lb. to one pan of the scales, what must you add to the other to make the scales balance?" "If you add 5 to one member of an equation, what must you add to the other member to keep them equal?" If you multiply one member by 3, what must be done to the other member?" "If you divide one member by 10, what must be done to the other member?" "If you perform any operation on one member, what operation must you perform on the other member?"

2. *Presentation.* Questions of the following types:

If $5x = 10$, what is the value of x?
If $\frac{1}{2}x = 15$, " " " " " "
If $\frac{5}{10}x = 15$, " " " " " "
If $0.5x = 15$, " " " " " "
If $0.01x = 2$, " " " " " "
If $0.05x = 2$, " " " " " "

3. *Generalization.* Questions of the following types: "Given $3x = 45$, you find the value of x by dividing both members by what numbers?" "Given $.0.05x = 10$, you find the value of x by dividing both members by what number?" "Given $\frac{8}{100}x = 40$, by what number must both members be divided to find the value of x?" Given $6\%x = 30$, by what number must both members be divided to find the value of x? In general, given any per cent of x, what must be done to find the value of x?"

4. *Application.* Problems like the following:

$6 is 3% of how many dollars?
$9 is 4½% of how many dollars?
10 lbs. is 3⅓% of how many pounds?
50 is 100% of what number?
25 is 6¼% of what number?

The following form is recommended for written work:

1. $0.06x = 18.$
2. $\therefore\ x = 18 \div 0.06$
$= 300$

The Beginning of Interest.

By OSWALD SCHLOCKOW, Instructor, New York City.

PREPARATION.

Remarks.—The substance of the answers, in the words of the pupil, can easily be elicited by skilful questioning.

Q. "Suppose a man feels certain he can gain a sum of money in a business transaction, but has no capital to begin with; what can he do?" A. "He can borrow from some one who has more money than he needs."

Teacher: "Let us suppose that *A* borrows $10,000 from *D*, begins business, succeeds, and finds that he can return the sum borrowed. How much shall he return?"

Suggestion.—Take vote of class to arouse interest; some will say $10,000, others, more than the sum borrowed. Take up answer of first set.

Q. "Why do you think *A* should return $10,000?" A. Because that is what he borrowed from *D*, who, if had not given the money to *A*, would have kept it in a safe, which would not have increased the sum; he can consequently expect no greater return."

Teacher, to the other part of the class: "Show why *A* should return more than $10,000 to *D*." A. "*D* would not have kept the money in a safe; he might have bought pictures, books, or carriages for it, or he might have used it to start a business of his own. Having foregone either the pleasure or the use of his money, he is entitled to a return in excess of the sum borrowed. *A*, moreover, would not have gained anything without the use of *D's* money; in full justice he ought, therefore, to give up a share of his gain to *D*, who helped him in realizing a profit."

The discussion is to show the justice of paying interest.

PRESENTATION.

Teacher tells class that *A* is called debtor, *D* the creditor. ' We have just learned that a debtor ought to return to a creditor a sum greater than that borrowed. The sum paid for the use of the debt is called *Interest*, the debt itself is called *Principal.*" Ques. "Suppose *A* borrowed $10,000 from D, and *B* borrows

$20,000; would it be proper for both *A* and *B* to pay, let us say, $300 interest to *D?*" Ans. "It would not, for *B* borrowed $20,000, and therefore has a chance to gain twice as much as *A*, who borrowed $10,000; he should therefore pay twice as much interest." Teacher: "Interest cannot then be reckoned in fixed sums, but should rather be taken as a certain part of the principal." Ques. "Suppose that *D* demands $\frac{1}{20}$ of the sum lent to *A* and *B* as interest, how much would each have to pay?" Ans. "*A* $500, *B* $1,000." Teacher: "Interest, however, is always reckoned in hundredths; instead of saying $\frac{1}{20}$ we say 5 %. This is called the *Rate of Interest.*" Ques. "Of what is it always taken?"

Q. "Suppose that *A* borrowed a certain sum for one year, and *B* an equal sum for 2 years; should they pay the same amount of interest?" A. "No, for one keeps the money twice as long as the other and should hence pay twice as much interest."

Q. "Then what must we consider beside the rate in order to get the interest?" A. "The time for which the principal is lent."

Teacher. "When we say the rate of interest is a certain per cent. of the principal, the time is always considered to be one year."

LESSON II.

Q. "What will be the interest of $1,000 for 3 years at 5%?" A. $150, because the interest for 1 year will be 5% of $1,000 which, is $50, and for 3 years it will be 3 times $50, which is $150."

GENERALIZATION.

To find the interest of any sum for a number of years, multiply the principal by the rate for 1 year, which will give the interest for 1 year, and multiply this by the number of years. This rule should be stated by the child in his own language, and should be the outcome of a number of examples like those just stated.

APPLICATION.

1. A man borrows $3,600 and keeps it 2 years, rate of interest being 6%; find the interest.
2. *A* borrows $600 from *B* on March 14, 1894, and returns it March 14, 1896, with 7% interest. How much does he return? This is called the ***amount.***
3. If I borrowed $470 on April 6, 1892, and returned it October 6, 1893, how much interest ought I pay at 5%?
4. Which will yield more interest and how much; $600 lent at 8% for 1 year 6 months, or $800 lent at 6% for 2 years.
5. A man sold his house and lot for $12,500; the terms were $3,000 in cash on delivery, $3,500 in 9 months, $2,800 in 1 year 6 months, and the balance in 2 years 4 months, with 6% interest. What was the whole amount paid?

Proportion.

By Freeman Allen, Teacher of Arithmetic Methods in the Potsdam State Normal and Training School.

IN presenting proportion to a class it is presupposed that the work of the earlier grades and lessons has secured to the pupils a readiness in recognizing and working with ratios, whether represented by fractional form, the division sign, or the sign of ratio,

E. g. 1. What is the ratio of 10 to 2? Of 2 to 10?
2. What is the ratio of 5 ft. to 6 in.? Of 6 in. to 5 ft.
3. What is the ratio of $2\frac{1}{2}$ to $\frac{3}{4}$? Of $\frac{3}{4}$ to $2\frac{1}{2}$?
4. Express the inverse ratio of 5 sq. in. to 1 sq. ft.
5. In what three ways may the ratio of 28 to 4 be expressed?
6. What is the name given to 28 in each expression? to 4?
o 7?

In the following abstract of lessons in proportion the writer has mitted, for the sake of brevity, the answers of the pupils. Excepting in two or three instances, which are indicated by *Ans.* the quesons and statements are supposed to be made by the teacher, and it assumed that each qusetion has been correctly answered before le following one is asked. Suggestions or comments by the writer e indicated as *Notes*.

Abstract of lessons in teaching proportion in the seventh year.

I. THE PROPORTION.

1. Compare the following ratios:---
and $\frac{12}{15} : \frac{5\text{ lbs.}}{8\text{ lbs.}}$ and $\frac{10\text{ men}}{16\text{ men}}$; 6 / 8 and \$14 / \$15; 6 : 4 and 18 in. : 1 ft.;
-50 : \$5 and 3 : 5 ; $\frac{5}{7}$ and 20 : 28; etc.
2. A comparison of equal ratios is a proportion.
3. Select the proportions in the above.
4. Write a proportion using abstract numbers.

Ans. 3 / 4 = 6 / 8, or 5 : 9 = 10 : 18, or 7 : 5 = 14 : 10.

Write a proportion using numbers of men and numbers of days.
Write a proportion using fractions and pounds.
Why are these proportions?

5. In the proportion a / b = c / d, a, b, c, d are called the *terms*, and d the *extremes*, and b and c the *means*.

6. Which terms of a proportion are antecedents? Which re consequents? Which are divisors? Which are dividends?

Which are numerators? Which are denominators? Which are means? Which are extremes?

II. Application of the Proportion.

1. Given the proportion $x/5=24/30$, how find the first term? *Ans.* Multiply both ratios by 5.

2. Given $4/x=12/21$, find the value of x.

Given $10/17=x/34$, find the value of x.

Given $5/9=15/x$, fiind the value of x, etc.

3. Compare the product of the means with the product of the extremes in each of the above proportions.

Given $a/b=c/d$, a, b, c, d, representing any quantities. Show by multiplying both ratios by bd that the product of the means always equals the product of the extremes.

4. Find the missing term in these proportions: $15:50=x:70$; $16=150:300$; etc.

III. The Proportion Applied to Concrete Problems.

1. Why must the terms of a ratio be like numbers?

2. If 16 yds. of cloth cost $30, what will 10 yds. cost?

In the above problem what number together with the answer can form a ratio?

What two other numbers can form a ratio?

Let x equal the cost of 10 yds. Express the ratio of $x to $30.

Express the ratio of yds. which is equal to this.

Why are they equal?

Why have we a proportion?

Find the value of x.

3. If a vertical rod 12 ft. long casts a shadow 7 ft. long, how high is a tree which under similar circumstances casts a shadow 84 ft. long?

What shall we let x represent?

What with it shall form the first ratio?

Express the second ratio.

Why have we a proportion?

Find the height of the tree.

IV. Direct and Inverse Proportions.

1. If a certain number of men do a given amount of work in a given time, what will be the effect on the amount of work done for the same time if I double the number of men? *Ans.* It will be double.

Here the number of men *varies directly* as the amount of work.

How would doubling the number of men effect the time required to do the same work. *Ans.* It would require half the amount of time.

Here the number of men *varies inversely* as the time required.

2. When one quantity varies directly as another, the two are said to be *directly proportional;* and when one quantity varies inversely as another, the two are said to be *inversely proportional.*

3. State which of the following, other things being equal, are directly, and which are inversely proportional:

(*a*) Number of pounds purchasable for a given sum, cost per pound. (*b*) Weight of goods carried for a given sum, distance. (*c*) Cost of carrying goods, distance. (*d*) Number of workmen, work done. (*e*)Work done, time required. (*f*) Number of workmen, time required. (*g*) Price of bread, price of wheat. (*h*) Price of bread, size of loaf. (*i*) Price of wheat, size of loaf. (*j*) Principal, interest. (*k*) Interest, time. (*l*) Time, rate of interest, etc.

V. PROBLEMS.

Note. Almost the only arithmetical applications of value for proportion are in problems involving similar figures, and problems in physics.

The science lessons belonging to this and previous grades have introduced machines involving the law of levers, a law which not only uses proportion in its statement, but which furnishes considerable material for applied problems,

Aside from the problems already indicated under IV., the following may be suggestive.

1. Two similar triangles have bases 10 in. and 25 in. respectively. If the larger triangle has an area of 75 sq. in. what is the area of the smaller one?

2. If a pipe 1½ inches in diameter fills a reservoir in 1 hr. 20 min., how long will it take a pipe 3 in. in diameter to fill it?

3. The specific gravity of ice is .92. What is the weight of a cake of ice cubic in form and 20 in. long? (A cubic foot of water weighs 62.5 lbs.)

4. A sphere 12 in. in diameter weighs 30 lbs. What is the weight of a sphere of the same substance whose diameter is 16 inches?

5. The radii of a wheel and axle are respectively 6 ft. and 6 in. What force will be required to raise a ton, friction not considered?

6. If a power of 100 lbs. be applied to a lever 6 ft. from the fulcrum, what weight can be lifted, 4 in. from the fulcrum?

Note. While it is better to use the equality sign in expressing the proportion, and the fractional form ordinarily in solving problems, still it will be necessary later to teach the form $x : 4 :: 12 : 16$, for pupils will need a knowledge of this form in common scientific

Square Root.

By James J. Reynolds, Instructor, New York City.

LET us assume that the pupils are beginning the subject of square root. They have been taught how to find the power of any number; the meaning of the terms, *factor*, *exponent*, *square;* and have been especially drilled in the process of squaring numbers.

FIRST LESSON.

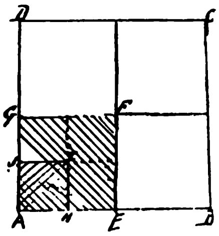
In this lesson, we shall try to cover the following:

1st. *Meaning of square root.*

2nd. *Extraction of the square root of perfect squares by inspection.*

3rd. *The square root of fractions and mixed numbers when the denominator and numerator are perfect squares.*

On the blackboard construct a square containing 4 sq. ft. Let one of the pupils measure the base, and tell result to class.



Teacher. We are told that the line A B is two feet long, how many square feet in the square A B C D? *Divide square into four equal parts with colered crayon, and block in one of the squares with red chalk.* The square A E F G has how many square *inches?* Why? The square A B C D? Why? If our diagram represents a square room, the owner of which has forgotten the length, but remembers that it takes 144 sq. ft. of carpet to cover it, how many feet long is the room? If it takes 81 sq. ft? 169 sq. ft? *Drill in this manner with all the perfect squares from 1 to 225. Emphasize the fact that, in each case, we have found the number which multiplied by itself, gives the given number.*

At this point it will be necessary to do a little didactic teaching. The name, *square root* and the symbol $\sqrt{}$ must be taught. It may interest the class to know that the symbol $\sqrt{}$, was introduced by a German mathematician, Stifelius, far back in the 15th century, and is a modification of the letter r, the initial of *radix*, or root. Formerly, the letter r was written before the quantity whose root was to be extracted, and this gradually assumed its present form $\sqrt{}$.

We are ready now for the formulation of a definition of *square root*. A concise and easily remembered form is: *The square root of a number is one of its two equal factors.*

Proceed to drill with symbol in numbers from 1 to 400, e. g. $\sqrt{9}=$? $\sqrt{16}=$? $\sqrt{361}$. It will be found profitable to drill in obtaining approximate roots; e. g., between what two numbers in the square root of 18? 35? 78? etc.

Turn again to diagram on blackboard; erase everything except the red square (1 sq. ft.). Have pupil divide it into four parts, and block in one part with blue chalk.

Teacher. The square A H I J contains what fraction of a sq. ft.? What is the length of the base? ($\frac{1}{2}$ ft.) What is the square root of $\frac{1}{4}$? *Draw diagram showing that $\frac{1}{3}$ ft. is the base of $\frac{1}{9}$ sq. ft.; $\frac{1}{18}$ ft. of a square containing $\frac{1}{64}$ sq. ft. $\frac{2}{3}$ ft. of $\frac{4}{9}$. Have pupils draw on paper a one inch square, and divide into* 64 *equal parts.* Teacher. What is the area of of smallest square on your paper? ($\frac{1}{64}$ sq. in.) What is its base? (Place on blackboard $\sqrt{\frac{1}{64}}=\frac{1}{8}$.) In the same way, bring out that $\sqrt{\frac{4}{64}}=\frac{2}{8}$; $\sqrt{\frac{9}{64}}=\frac{3}{8}$; $\sqrt{\frac{16}{64}}=\frac{4}{8}$. In this manner proceed until the class sees that the square root of a fraction is *equal to the square root of its numerator divided by the square root of the denominator.*

The mixed number $2\frac{1}{4}$ is equal to what fraction? What is the square root of $\frac{9}{4}$? of $5\frac{4}{9}$? of $5\frac{1}{16}$. How, then, do we find the square root of mixed numbers?

Reduce to an improper fraction and take square root of numerator and denominator.

Practice on concrete example, finding exact and approximate roots.

SECOND LESSON.

Square root of numbers of four digits.

Arouse interest by stating how necessary a knowledge of the power of finding the square root is to surveyors, engineers, navigators, etc.

Review salient feature of previous lesson. What is the square root of 100? 400? 900? etc.

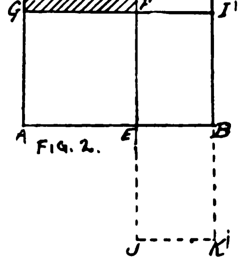


FIG. 2.

Construct on the blackboard an 18 in. square, without, however, letting class know base measure.

Teacher. Let our diagram represent a square mat containing 324 sq. ft. Is the base greater or less than 10 ft.? Why? Greater or less than 20 ft.? Why? The length of H B is between what two numbers? Let us erect on A B a square whose base is 10 feet, and see if it will help us any. How many square inches will it contain? If we subtract it from the larger square, how many square inches have we remaining? (234) *Prolong the sides* E F *and* G F to

H *and* I. The "left-over" part consists of how many divisions? What do you notice about the divisions E B I F and G F H D? Let us take the part G F H D and "tack" it to the bottom of the other two parts. What have we now? (One long rectangle.) It contains how many square ft.? (134.) The side J H is how long? (.10 ft. plus "something.") What will be the width of the long rectangle? (Same as F H.) If F H was one foot, how many square feet in the rectangle? (21.) But we have how many? (234.) *By a little persistent questioning on this line you can draw from the pupils the fact that the distance* F H MAY be *obtained by dividing* 20 *into* 224. But it is contained 11 times. Is the base then 21 feet? Why not? The line F H *may* be 9 feet? If we are right the long side of the rectangle is how long? (29.) How wide is it? (9.) The area of the rectangle is then 29×9 sq. ft. or 261 sq. ft. Is this the area of the rectangle represented? What is the trouble? (Made the line F H too long.) What number will we try now? 8. It is discovered that 28×8 sq. ft. gives the required area, and that the square root of 324 is 18. On the blackboard the work should appear thus:

$$\begin{array}{r|l} & 324(\underline{10+8} \\ & \underline{100} \\ 20 & 224 \\ \underline{8} & 224 \\ \underline{28} & \end{array}$$

2nd Part. Dictate following: A surveyor found that a piece of property was an exact square and contained 1156 sq. ft. How wide a house could be built on the lot. *Have pupils draw diagram on paper to represent the lot.* T. The base will be between what two figures? 30 and 40, will be the answer if we have drilled sufficiently on the perfect squares ending in two ciphers. Proceed as in first part, except I would suggest that it adds to the interest if the pupils are allowed to cut out the top rectangle and actually place it at the bottom of the side rectangle. The long rectangle in this case contains 256 sq. in., and by a few pointed and definite questions, the method of determining the width of the rectangle is impressed. After a consideration of one or two more problems, having *diagrams* drawn in every case, we are ready to *formulate* a rule for the extraction of the square root of numbers of three and four digits. This will take various forms, and the writer does not believe it profitable to spend much time, at this stage, in memorizing any set form.

Practice a very little upon the problems in the text-books, which are usually totally lacking in both sense and interest, and take up, as soon as possible, the right-angle triangle.

THIRD LESSON.

Review briefly *Lesson II.*

Indicate need of finding a method of extracting the square root of numbers containing more than four digits.

T. What is the square of 100? of 200? of 300? etc.

Place on the blackboard $\sqrt{10000}=100$ $\sqrt{40000}=200$ $\sqrt{90000}=300$, etc.

T. Let us suppose we have a square containing 47961 sq. ft., and it becomes necessary to know the length of its sides:

Draw on blackboard the square A B C D

T. What perfect square ending n four ciphers is the nearest square oot of 47961? (40000). What is the uare root of 40000? The side A B between what two numbers ending *two* ciphers? (200 and 300.) If e take the square of 200 ft. from B C D, we have how many square et left over? (7961.) *Be certain that pupils have a definite conception of at is meant by this. Prolong lines* E *and* G F, *color the rectangle* G F H D *h red chalk; and place its equal,* E J B *to the bottom of the side rectangle.*

The rectangle H J K C contains w many sq. ft.? (7961). The part F, which you notice is the larger rt of the longer side of the rectangle, is how long? The length of F H is between what two umbers ending in one cipher? (10 and 20.) Why? (*This is important point and must be dwelt upon until perfectly clear.*) Let us btract from our long rectangle, a rectangle 410 ft. by 10 ft., what ill be left? (7961−(410×10)=3861 sq. ft.) This "left over" rt consists of how many parts? *Tack the small rectangle* L M R H *the bottom of the long, narrow rectangle,* P K C R. What is the ngth of N M? (420 ft.) Between what two numbers is M R? —10.) Why? How shall we *probably* find the value of M R? y dividing 420 into 3861.) Are we sure the quotient will be the quired number? How can we prove that we have the correct value of M R? In this case, is the quotient the correct value of M R? hy? (Because, if N R=429 ft., and R C=9 ft., the area of N O R will be the required value 3861 sq. ft.) The base of A B C D s how long? (200+10+9 or 219 ft.)

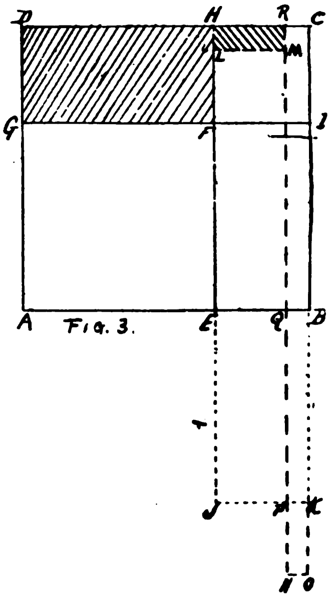


Fig. 3.

The foregoing may seem at first reading, somewhat difficult, but it will be found far better to go over the explanation, again and again, using the geometrical figure in all cases, than to have the pupil simply learn by rote the usual arithmetical rule. When the reason for each step has been thoroughly mastered, then we can proceed to the formulation of a rule, and, if definite images accompany each step, the form which it takes, is immaterial. The usual rule, found in all arithmetics, *translated* and *clarified*, may be memorized, to insure speed and uniformity of arrangement.

What has been suggested under application in *Lesson II* applies here with equal force.

To Find the Area of a Circle.

By Edward J. McNally, Instructor, New York City.

EFORE giving a lesson on "The Area of a Circle," it is to be understood that the pupils are familiar with the following: How to find the area of a rectangle (and other parallelograms): se × altitude. How to find the area of a triangle: ½ base × altile. The relation existing between the circumference and the meter: 3.1416 to 1.

Two of the methods that may be used are:

1. Find the area of a sector, the arc of which subtends an angle 1° at the center; then multiply by 360, the number of such tors in a circle.

2. Consider the circle divided into semi-circles each of which is ided into an equal number of equal triangles. Separate the trigles of one semi-circle at the apices and extend the bases along a aight line. Separate the triangles of the other semi-circle in like nner and place them in inverted direction in spaces between angles of the first set. There will thus result a figure correspond- to a parallelogram the area of which is to be found.

The first method may be objected to on the ground that it starts th the abstract.

The second method which is the one selected admits of abund- graphic demonstration. It affords a good opportunity of proding from the concrete to the abstract.

The Lesson.

Each pupil being supplied with three circular pieces of cardard, the method of procedure is as follows:

Tell the pupils to draw on one of the circular pieces, diameters right angles. (Fig. 1.) Then have them cut along the straight es obtaining *four* triangles whose bases are curved lines. ve these triangles arranged as in Fig. 2, the straight lines AB, to be drawn. The figure ABDC is a parallelogram whose area

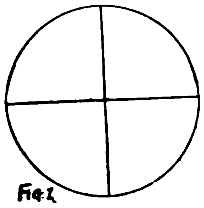
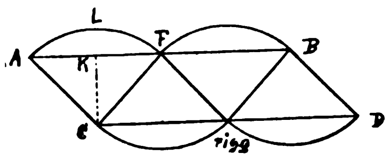
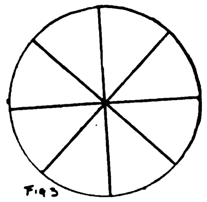


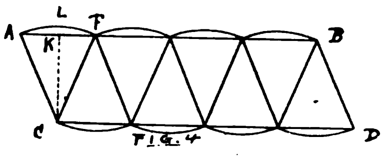
Fig 1



is CD × CK (a fact already known to the pupils from their knowledge of area of any parallelogram).

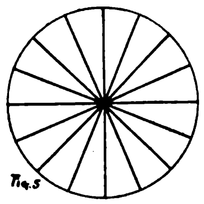
Next, have pupils draw on second circular piece of cardboard, diameters as in Fig. 1, and in addition another pair of diameters so placed as to bisect the triangles already drawn, thus dividing the circle into *eight* equal triangles (bases being curved lines). (Fig. 3.)

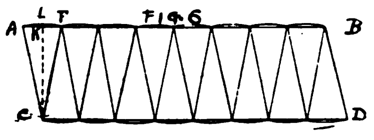




Follow same arrangement as before and have lines AB, CD drawn. (Fig. 4.)

Proceed in like manner with third circular piece of cardboard, doubling the number of diameters so as to bisect each of the eight triangles made equal to those in Fig. 3, thus obtaining *sixteen* equal triangles as in Fig. 5. Arrangement as before, lines AD, CD being drawn. (Fig. 6.)





In each of the parallelograms in figures 2, 4, 6 the area is equal to CD × CK, *i. e.*, base × altitude (apothem). As the pupil proceeds from Fig. 2 to Fig. 4 and then to Figure 6 he sees that with each step the arc ALF approaches more closely the chord AF; and that the altitude CK approaches more closely the side AC or CF (radius).

From these *concrete* instances we may proceed to consider the *abstract* in the cases of circles divided into equal triangles numbering 32, 64, 128 respectively and so on, until an infinite number of divisions of the circle is made, at each step the arc ALF more closely corresponding to the chord AF, until finally the arc becomes so small as to practically coincide with the chord. In this last case the apothem is practically equal to the radius.

From Fig. 6, the area of ABDC being CD × CK, since the sum of all the arcs from C to D is equal to one-half of the circumference, we have (remembering that the arcs below CD in the case of an infinite number of triangles coincides with the line CD, and the altitude [apothem] CK coincides with the radius)

$$\text{Area} = \tfrac{1}{2}C \times r$$

The pupils already knowing (as stated at the outset) that the relation of the circumference to the diameter is

$$3.1416 : 1$$

or

$$\pi : 1$$

we obtain

$$\begin{aligned}\text{Area} &= \tfrac{1}{2}(2\pi r) \times r \\ &= \pi r^2\end{aligned}$$

The derivation of the rule should be followed at the same lesson by practical problems showing the application. These should be very short at first.

For the *succeeding* lesson the following are offered by way of suggestion.

1. What is the number of square inches in a circular piece of zinc, the diameter of which is 30 inches?
2. A cow tied to a stake in a field, by a rope 10 feet long. What is the area (in square feet) of the ground over which the cow can graze?
3. What is the air pressure on a circular skating pond, the diameter of which is 200 feet?
4. Find the area of a quadrant if the diameter is 20 feet.
5. I wish to have a circular opening to a tank, equivalent to an old one 8 inches square. What radius is necessary?

Editorial.

THE publication in 1895 of McLellan and Dewey's *Psychology of Number* turned the thoughts of American teachers to a consideration of principles underlying their procedure in the teaching of arithmetic. Since that time efforts have been made to lift method in elementary mathematics out of the low level of empiricism up to the heights of science, by an historical and analytical review of the mathematical consciousness; to relate logically the content and order of number-work to the psychological genesis of the number-concept; and to examine the customary practices and devices of the teacher of arithmetic in the light of the criteria revealed by such study. The stimulating effect of the *Psychology of Number* was due partly to the acute analysis and scholarly tone which marked its argument, but in greater measure this effect was due to the challenge which the book contained to every teacher of arithmetic. The work was not free from error. In making measurement the source of the number-concept, regardless of the fact that measurement presupposes number, its psychological analysis was at fault; and in referring all arithmetical operations to the manipulation of concrete magnitudes and excluding pure number from arithmetic, its psychology and pedagogy were both at fault. These defects were immediately pointed out by the scholarly Lefevre.* Yet they have reappeared in several recent works on arithmetic.

Probably the most prominent of the attempts "to psychologize" arithmetic in America was that made by William W. Speer through his series of text-books, the first of which appeared in 1896. The Speer "method" has been widely adopted by educators, particularly in the cities of the West. An examination, by the writer, of the recent reports of the superintendents of schools of a dozen cities, taken at random, reveals the fact that in eight of these cities the Speer "Method" is wholly or partly in use. The characteristic features of the "method" are its identification of number with ratio, its substitution of measurement for counting, and its practical aim, "to induce judgments of relative magnitude." Each of these features has its critics. Besides the criticism of Lefevre who wrote before the advent of the Speer "method," these ideas have been reviewed by D. E. Phillips,* E. E. White,† and D. E. Smith,‡ with reference to the origin of the concept of number. On the practical side, Dr. White takes issue in this number of the MONOGRAPH with the contention that relations between numbers cannot be perceived without sensing or imaging corresponding concrete magnitudes. He declares further that the habit of imaging numbers as concrete magnitudes is "a serious obstacle in acquiring a true knowledge of number." Superintendent Greenwood finds the source of concepts of number "in certain relations of objects to time." This accords with the view of Lefevre: "The concept which appears to me most like the first development of primary number . . . is Time." This view is suggestive of a method distinct from the comparison of geometric magnitudes, which the mind senses and the imagination constructs always in space.

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* *Number and Its Algebra*, by Arthur Lefevre, in Heath's Pedagogical Library, 1896.

Whatever the issue in this controversy on the foundations and methods of arithmetic-teaching, the early introduction of the idea of ratio which Speer embodied in his method, seems to have a recognized value that will make it permanent.

. . . .

The Grube method, which alone out of the multitude of methods devised by German teachers, came to America, is rapidly osing its brief prestige. The "fixed unit" idea received its deathblow from McLellan and Dewey in 1895, and the "method" has been waning since. It persists, however, in a modified form in a ew cities, notably in the course of study for the lower grades in New York City. On the other hand, Grube's method is still much n vogue in England. In these matters England is farther from Germany than America.

J. C. B.

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*Pedagogic Seminary, October, 1897.

† Early Teaching of Numbers as Ratio.

‡ The Teaching of Elementary Mathematics. Macmillan, 1900.

THE title of the next MONOGRAPH will be Oral and Written Composition. There is no subject in the curriculum that is more important nor that requires so much skill that it may be adequately taught.

THE MONOGRAPH ORAL AND WRITTEN COMPOSITION will discuss how pupils may be trained to a keen appreciation of the strength and beauty of the English language and acquire mastery in its everyday use.

On another page will be found the names of the contributors to the COMPOSITION MONOGRAPH. Below is presented a partial list of the topics it is proposed to discuss.

THE GENERAL SUBJECT OF COMPOSITION:
  A. A METHOD OF TEACHING COMPOSITION IN THE FIRST THREE YEARS
  B. A METHOD OF TEACHING COMPOSITION IN THE HIGHER GRADES
ORAL AND WRITTEN REPRODUCTION BY CHILDREN OF SHORT TALES, STORIES AND FABLES
CONVERSATIONS BY THE TEACHER, UPON TALES AND STORIES TOLD OR READ TO PUPILS
RECITATION OF NURSERY RHYMES AND POETRY
CONVERSATIONS UPON CHILDREN'S CLASSICS
ELABORATION OF SHORT STORIES SUPPLIED BY THE TEACHER
SPELLING—ORAL AND WRITTEN—IN THE FIRST THREE YEARS
MEANING AND USE OF WORDS (IN THE FIRST THREE YEARS)
SIMPLE LETTER WRITING (FOR THIRD YEAR PUPILS)
MEANING AND USE OF WORDS (IN THE LAST FOUR YEARS)
SPELLING IN THE UPPER GRADES
THE USE OF THE DICTATION EXERCISE
THE USE OF THE DICTIONARY
LETTER WRITING: *A*. BUSINESS. *B*. APPLICATION AND INQUIRY
THE USE OF THE TOPICAL OUTLINE (IN THE SIXTH AND SEVENTH YEARS)
ON THE CORRECT USAGE OF WORDS
THE CHOICE OF WORDS AND THE DISCRIMINATION OF SYNONYMS
CRITICISM AND NOTICE OF BOOKS
NARRATION—PERSONAL
NARRATION—FICTION—ORIGINAL STORY
NARRATION—HISTORICAL EVENT
DESCRIPTION—OBJECT
DESCRIPTION—SCENERY
DESCRIPTION—PERSONAL
ARGUMENTATION
EXPOSITION
THEME, PARAGRAPH SENTENCE
PUNCTUATION
COMPOSITIONS BASED UPON LITERARY MASTERPIECES

Every feature of Oral and Written Composition, in all the grades of the elementary school—commencing from the first half of the first year and continuing through the last year, will receive comprehensive treatment.

New York Teachers' Monographs.

. . . COMPOSITION . . .

JUNE, 1901

Steps in Composition-Writing.

By R. C. METCALF, Supervisor of Schools, Boston, Mass.

A PRE-REQUISITE of all composition work, whether in school or out, is something to say that is worth saying. Certainly no time should be spent in the schoolroom in training pupils to tell what they do not know. The general order of procedure is (1) know, (2) tell. The specific order may be stated as follows: (1) Books should be read, lessons studied, subjects investigated; in short, information gathered everywhere within reach. (2) Oral work, in which the results of study and investigation are re-examined, sifted, digested. (3) Analysis of notes arranged in suitable order. (4) Composition.

Composition in the lower grades will differ somewhat from that in the higher. Teachers will read more to the pupils in the years when the latter are less able to read for themselves. Subjects that need study and investigation will be less prominent in these grades, and the reproduction of stories that have been read or told to them will furnish much of the material for their compositions. For original work in the lower grades attention should be directed to fables and folk-stories, and to the child's own imagination, which is likely to be extremely productive at this stage of his experience.

The form which the composition may take should be taught in the dictation exercise. Neither the child's work nor that of the teacher should be hampered by ignorance of what may be termed the "mechanics" of composition. These dictation exercises should be frequent during the second, third, and fourth years of the pupil's school life, and later their frequency should be regulated by the pupil's need as indicated by his daily composition. The object of dictation exercises is to make the pupil familiar with the various forms which compositions take,—the headings of letters, forms for closing letters, division of composition into paragraphs, and also the use of capital letters, and punctuation marks, abbreviations, etc. When the pupil is familiar with the "mechanics" of composition he can give his undivided attention to its content.

In all the grades the daily recitation should give opportunity for a short, written composition. Some interesting topic, which has been considered in the oral part of the recitation, may become the subject of a brief written composition just at the close of the exercise. A single paragraph may be sufficient to include all that the pupil can say upon this subject, and this is written under the best possible conditions, because the oral recitation has made suitable preparation for the work. These compositions are collected and placed upon the teacher's table for examination as he finds time. Only a few of them will be carefully examined, but the few will furnish him with notes for a class exercise in criticism that may be exceedingly helpful.

The class-work in supplementary reading, carried on as it usually is in all good schools, furnishes abundant material for written compositions. The reading for the day may be a story in which the children have become interested. It not only has been read but it has been discussed by the pupils. They are familiar with all the details so far as they have been developed in the reading. A few minutes before the close of the "reading hour" the teacher asks for the outline of the story. This is sketched orally by some pupil, his mistakes being corrected by the children who are listening. The sketch is then written, and the compositions collected as before and placed on the teacher's table. The examination and criticism of these papers will follow the same lines as already indicated above.

It may not be out of place to suggest that slovenly work should not be permitted. Teachers and pupils alike should offer only their best work. The teacher who undertakes to conduct a recitation before suitable preparation has been made in her own private study is hardly justified in condemning the work of a pupil who has faithfully followed her example. No matter how short the composition or how few the minutes that can be given to it, let it be written with pen and ink, upon good paper, with all the care which the pupil is capable of giving.

The class-work in supplementary reading, as well as the books for home reading, will also furnish, for written composition in the higher grades, subjects like the following:

(1) Write, as to a friend, an account of the most interesting character you have found in your book. (2) Recall the description of a beautiful sunset given in the story we have just read, and tell it in your own words. (3) In our reading to-day reference was

ade to A's home. Describe that home as you see it in your nind's eye," (*a*) the house, the yard, the barn; (*b*) a beautiful view om a hill near the house; (*c*) the family.

Such compositions must first be carefully thought out, then tes made and arranged, and finally the composition written. veral days will often be required for the completion of a composi- on of this kind, but it is time well spent.

A word in reference to "notes" may be necessary. In the wer grades teachers should write upon the blackboard suggestive ords and phrases to stimulate the thought of their pupils. The llowing may indicate the kind of suggestion necessary:

Subject: "How Willie made a kite, and what happened to it."

NOTES.

Saturday afternoon.—Willie's friend Peter. Shape of kite; me-work; paper to cover it; who made the paste; how they got e kite string.

Next Saturday.—The pasture back of the house; the wind; o held the string; more tail needed; kite goes up finely; caught a tree; big hole. Better luck next time.

The same notes may be used for several lessons, a few of the st compositions being read to the class each time.

The next step follows naturally. The subject for a composi- n by the whole class is selected, and notes or suggestions are de by the pupils themselves and written upon the blackboard, the cher directing the work and giving needed help. Finally, each pil makes preparation for his composition by writing out his own es and arranging them in suitable order. He is thus led by suc- sive steps to make his own preparation and to depend upon his n efforts, in the higher grades, for every part of the work re- ired of him.

With the notes for a composition before the class, the principle paragraphing may be taught. Pupils in the lower grammar ades will soon learn to group in one paragraph the topics that y be considered together. In the higher grades, where pupils ve more to say upon each topic, the making of sub-topics should explained and the need of a greater number of paragraphs made ar.

In the grammar grades pupils should be urged to undertake iginal work as early as possible. In letter-writing, even in the imary classes, children should frequently be allowed to cut loose om hints, suggestions, skeletons, and notes, and write "as the irit moves them," without let or hindrance, to father, mother, acher or friend. The utmost freedom should be granted as soon freedom is warranted. In the higher grades of the grammar school pupils should be required to make careful studies of public institutions, works of art, city or town industries, and public improvements. Subjects like the following may be assigned for study or investigation: The Public Library; The Soldiers' Monument; The New Town Hall; The Elevated Railroad; The Subway; The Park; An Incident in the Early History of the Town; Our Principal Industry, etc.

Such subjects have a living interest to the pupils; they require careful study and much personal investigation. If skilfully directed they will arouse much interest and add materially to the pupil's capacity for independent thinking. Any subject like those enumerated above will require two or three weeks for preparation. The notes taken by the pupils while making their investigations should be carefully arranged by themselves, attention being given to the order in which items of information should follow each other. Finally, the composition and then submitted to the teacher for examination.

If the work in dictation has been thoroughly done in the lower classes, few errors in the "mechanics" of composition will be found, and special attention can be given by the teacher to its structure, to the accuracy of the information obtained, and to the felicity of expression. Class exercises, during which the more important errors are discussed, should follow and may be made exceedingly profitable.

Thoughts on Composition-Teaching.

By John H. Haaren, Associate Superintendent, Brooklyn, N. Y.

COMPOSITION-WRITING is an exercise and not an end in itself. Its aim should be, not the production of pretty little essays, but the cultivation of the habit of clear expression in writing.

A statement of the end of composition-writing may appear unnecessary. Let us see. Here we have a set of compositions written by a class. The form is neat, the penmanship exact, the spelling correct, not a punctuation mark missing, nor a capital letter wanting or misused, not a flaw in the structure of the sentences. Every composition contains the same number of paragraphs, and every sentence nearly the same number of words. The compositions have been produced in the manner known to every teacher. She has carefully analyzed the subject, divided it into the four or five topics which will appear to embrace the points desirable to be treated, and perhaps read a model composition on the subject, written either by herself or by a member of a former class. The pupils then proceeded to write. The writing finished, the teacher corrected every exercise and transformed it into a pretty little essay. But perhaps the first draft written by the pupils is presented. What was the preparation for the exercise? One method is indicated in the following: Every day all the members of a class prepare to write on a topic. The paragraph that is best is taken as a model. When the day comes for writing the composition, the prepared paragraphs are put together, and thus constitute the first draft of the composition. The latter plan has a good deal to commend it. At least it presupposes some teaching. But take the class trained by either of these methods and try it with a subject, not unfamiliar, but which does not fall within the routine of the instruction, and the results will show that the end of composition-teaching has not been kept in mind.

For losing sight of the end of composition-writing, I consider that not the teacher, but the supervising powers are at fault. Not only are neat Baconian or Spectatorial essays expected, but these must be finely written, and without a mistake in spelling, punctuation, capitalization, grammatical construction, or paragraphing. Occasionally, a supervisor is found who desires to see only the first draft. Whatever the supervisors want, the teacher is willing enough to give. So the first draft is prepared as has been described; or, under the other plan, the mistakes as to the details just enumerated are carefully corrected by the teacher until, finally, the only part taken by the pupil, outside of deciphering the corrections, is that involved in the penmanship exercise.

The weight of the burden imposed on the teacher by this latter plan has been appreciated by some authorities, and efforts have been made to reduce it. Pupils have been encouraged to correct their own errors in spelling, use of capitals, grammatical construction, and paragraphing, and detailed correction by the teacher has been restricted to the work of only a portion of the class.

This plan has worked well in reducing the teachers' burden, and it has been found feasible to attempt things that were considered impossible under the plan of laboriously correcting every composition.

One result is a great increase in the number of compositions written each term. The penmanship is clear and neat, if not beautiful. Since but one draft is written, pupils acquire the habit of framing their sentences before committing them to paper. The sentences consequently are apt to be short. Thus clearness is promoted. When a succession of short sentences becomes monotonous, the exercises that formed part of the supplemental language drill have taught how the monotony may be broken by combining simple sentences into compound or complex sentences.

Under the plan it is not considered criminal for a pupil to draw a line through a word, or phrase, or sentence, if by doing so the expression can be improved. Exercises in the choice of words make the pupils critical. They soon appreciate the value of words and learn to change them so as to secure the shade of meaning required. The use of prepositions and pronouns with some degree of correctness is soon acquired, as well as considerable power of logical arrangement.

The skilful teacher manages to devote attention to all of these things without interfering with whatever fluency of language the pupil may possess. All compositions in a single exercise may not be of the same length, but the number of pupils afraid to write lest they make mistakes becomes small.

These results may be obtained in schools in which the work has been organized. The pupils of one grade then do work which fits easily, because naturally, into that of a higher grade. There is abundant exercise in the use of the pen. Correct oral expression is assisted, if not secured, because the teacher habitually uses language correct as to grammar, and select as to use of words. The reading has not been confined to one book, and to but a small portion of that one. There has been an abundance of supplementary reading done by the pupil at home at his leisure, and the teacher frequently reads to the class something that is a model of thought and expression. The memorizing of selections is confined to gems that have been cut and polished and set by masters. Nothing is memorized but what is worth remembering for the thought it contains and for the skilful manner in which the thought has been expressed. If these selections contain words that are in the written vocabulary of the pupil, they are frequently written from memory.

I have before me a letter written by a person of little culture. The writing is clear, the spelling not very faulty, and the employment of capitals and of punctuation marks has not been overlooked. Although the grammatical construction is queer, concords being wanting and subjects left without predicates, yet the meaning of the letter is unmistakable. The writer had an idea, and the words somehow managed to convey it. But the awkward expression is doubtless quite unlike what the writer would employ were the idea conveyed by word of mouth. I can account for the awkwardness only by considering the mechanical difficulties which had to be encountered. Penmanship, spelling, capitalization, punctuation, and perhaps grammatical structure, were not difficult when taken singly, but when taken together, and another difficulty added, that of finding words for the idea to be expressed, the task was too much.

These same difficulties are encountered by our pupils in their composition exercises. Hence a well-graded course of language-study should recognize the difficulties. Some courses of study begin by requiring model compositions to be copied, then written from dictation, then written from memory. Writing selections from memory is an exercise of equal utility with this last. The next step of language-study consists in answering questions which can be answered by supplying a word or two and by changing the question to a statement. This exercise is good when not persisted in too long. But the teacher should, as soon as possible, ask questions that will demand something more from the pupil. The asking of questions which can be answered by reference to one of the text-books, and by using language different from that in the question, seems to me a good exercise. After writing from questions there should be writing from topics. Where all the pupils of a class are not able to write from topics, some may write from questions bearing on topics different from the ones used by the other pupils. Supplementing these exercises, pupils may be asked to write three, four, or five statements about some familiar object or incident. These statements should be rearranged and rewritten by the pupils, so that they will appear in their natural or logical order.

There is, of course, some value in writing compositions from topics written on the blackboard and elaborated by the pupils. But the method of *composition*, or putting ideas together in the form of topics, should not be overlooked. The development of a subject and its elaboration as topics should be an exercise in which the pupils do the greater part of the work and the teacher acts as recorder. Just as a person who is preparing an essay or an address begins by putting down an idea here and there, and afterward groups in some order ideas he has gathered, so ought the topics for the composition be arranged. The length of the composition written as a school exercise is not extensive, and if pupils were expected to treat all the topics brought out in a well-conducted recitation, the composition exercise would be drawn out to a tedious length. Hence a selection can be made of the topics; the only stipulation should be that the topics should *cohere*. Every little group of topics selected would be a whole in itself, and the writing of each pupil would be somewhat unlike that of every one else.

Practical Hints on Composition.

By Lewis F. Mott, Professor English Language and Literature, College City of New York.

THE large number of text-books on the subject of composition is certainly a sign of the wide interest at present felt in this subject; and yet one may be pardoned if he harbors the suspicion that the thing is a little overdone. We are always in danger of passing from one extreme to the opposite. Perhaps what we have now to fear is rather the excess, than the lack, of method in English nstruction.

There are obviously two main aims in such teaching: the student is to acquire knowledge of the subject, and he is to gain the power of applying this knowledge. Of these two, all will doubtless admit that the former is by far easier of accomplishment. Many a pupil can give the rules who fails utterly when applying them in practice. A boy writes: "On the 25th day of January, 1898, the United States battleship Maine entered the harbor of Havana, situated on the coast of Cuba, by the order of President McKinley." It s hardly to be doubted that, while many are capable of constructing such a sentence, few in the higher grades of our schools would fail n correcting the fault.

The knowledge to be imparted concerning the structure of the English sentence can be reduced to a few simple rules. Even the youngest pupils have the capacity of learning the essentials. They can, for example, understand that "a sentence consists of something you speak about and something you say about it; in other words, of subject and predicate, with the subject naturally first." Later, they can learn the principles applicable to more extended forms, some of which I have condensed elsewhere as follows: "Modifiers are grouped around these (Subject and Predicate) as near as possible to the word they modify. In English most modifiers precede; adjectives before nouns, adverbs before verbs, subordinate clauses, participial phrases, and often adverbial phrases at the beginning of the sentence. Inversion is permitted for emphasis and for adjustment. Predicate before subject, adverb after verb, subordinate clauses and other modifiers at the end become emphatic. In adjustment, words and phrases referring to what precedes are attracted to the beginning of the sentence." The rules of unity, variety and the placing of stress on the important words, are equally susceptible of condensation, and indeed, so far as rules are concerned, the fewer they are, and the more condensed, and the more frequently repeated, the better.

Evidently the understanding of such rules presupposes a competent knowledge of English grammar, particularly of the relations between what Sweet calls the logical and the grammatical categories. Certainly no one could feel more strongly than I do the absurdity of much that used to be inflicted upon our school children in the name of grammar, and yet even that appears to me better than no grammar at all. It must, of course, be only an incompetent pupil who cannot distinguish a preposition from a verb, but I fear that a large proportion even of our public school graduates have a rather confused conception of the difference between adjectival and adverbial relations, a matter absolutely essential to any proper teaching of composition.

In addition to the knowledge of the principles governing English construction, the pupil has the far more difficult task of acquiring a sufficient vocabulary. This is, naturally, a task which cannot be accomplished in a few brief years, nor can even the best teacher impart a mastery of words; yet much can be done in school, not only toward the actual knowledge of the signification and usage of a moderately large variety of expressions, but more especially toward the acquisition of habits of careful thought and inquiry through which every year of life will be made to yield its additions to the pupil's store.

That definitions should be given of all unfamiliar words met with in the reading lessons and perhaps also of words from carefully selected lists, is obvious, but much more is requisite. The pupil must have presented to him a considerable number of sentences in which each word is properly used. The boy who wrote, "The snake laid in an anonymous state," or "Jumbo was an elephant of anonymous size," did not recognize the word *anonymous*, and could not have defined it; he who wrote, "Susie had a very anonymous look upon her face as I stepped inside the door," probably had a confused idea that it meant *nameless;* but he who wrote, "The child was anonymous till two weeks after birth," could certainly have given a correct definition of the term, though he did not know the limits of its correct usage. It is, therefore, most important that words should be taught in sentences, and in varied sentences, as well as by definition. In this connection students should, as far as possible, be encouraged to make use of an unabridged dictionary, in place of the faulty, small school and pocket dictionaries now so common, and they should be induced to study, not only the whole list f definitions there given, and the entire group of cognate words, ut also the illustrative examples. They will thus be saved from uch faults as that of the foreign minister who prayed the Lord to ickle his congregation.

This knowledge of English construction and vocabulary is, owever, but part of that which a teacher of composition must instil nto his pupils. Far more difficult is the task of imparting Power, r the ability to apply the knowledge acquired. Here, it is not so nuch a system of instruction that counts, as it is earnest labor, con-tant attention and inspiring enthusiasm. Yet certain elements of nethod may be recommended. Exercises should be frequent, rather han long, and matters once taught should be insisted upon in all ubsequent work, until they become a second nature. Neatness in xternals is a great help to good composition; for, although the ex-eptional writer may, even in childhood, produce excellent literary esults, in spite of slovenly chirography scrawled over scraps of dirty aper, the average child learns to take pains in one matter by taking ains in all, and produces carefully considered sentences most aturally when paying greatest heed to cleanliness, legibility, and ll those formal conventionalities which constitute the decencies of e class-room. Accuracy in oral statement should be insisted upon, o matter what the subject of the recitation. The habit of blurting ut a few disconnected words in answer to a teacher's questions ould be rebuked, and complete sentences should be required. It ill readily be seen that such methods demand eternal vigilance on e part of the teacher.

Pupils should be stimulated to read as much good literature as ossible, for experience proves that the wider the reading the better e writing. Occasional imitation of models is advisable. Let the oys and girls put their own ideas into a form that they have tudied. On the other hand, the substance of the composition ought ften to be given, while the children are left to devise the form of he work. We should be on our guard against setting before these mmature minds tasks that might well puzzle the experienced intel-igence of their elders. The hopelessness of producing a given umber of words, even on a simple topic, is doubtless one of the everest trials of school life. Many can feel a thrill of sympathy ith the boy who filled up his stint on *The Steamboat* by writing: 'The invention of the steamboat by Robert Fulton has a great deal o do with the great number of ocean steamers plying from America o the ports of Ireland, England, Scotland, Russia, Denmark, Nor-vay, Sweden, Germany, France, Portugal, Spain, and the countries n the south of Europe, Africa, Asia, East Indies, Australia, and he West Indies, South America and Canada."

Important as it is that the subject-matter of the composition should be, in some way, set before the children, there is a further point which is of still greater importance. It is that every composition, however brief and of whatever kind, should have a purpose. Even the youngest can grasp this idea, and, both with them and with those more advanced, it does much to turn mere task work into a sort of modified pleasure. Above all, it helps more than any other single element to make the composition a reality. If one is writing merely to fill space, it is difficult to think. As in the example quoted above, sheer desperation will grasp at almost anything. But one desires to inform a friend of some incident, to describe a scene or a person, to explain a problem, to convince or to persuade, the thoughts come in such abundance that one appreciates the justice of the old English expression, *it thought to me*. In this matter, children, however limited their thinking power, feel the same stimulus. Let them have a purpose, and their utterance, though still impeded and imperfect, will be more fluent than when they vainly strive to write a hundred words on a given topic.

The study of composition is inexhaustible. The same sort of training that our pupils need, our teachers need also. The finer aspects of language yield their secrets only to the diligent seeker, and each search opens ever fresh fields of investigation. Every teacher of English should read for the sake of acquiring power, and should study selected texts and portions of texts exhaustively, weighing words, discriminating shades of meaning and suggestiveness, imitating various styles, attempting alternative modes of expression. It is only by constant self-growth that the teacher can hope to make the pupils grow.

How to Write and What to Write About.

By A. E Winship, Editor "Journal of Education," Boston.

TRADITIONS count for less and less in teaching and newness counts for more and more, but there will always be warfare between the worshippers at the shrine of tradition and of newness. The height of satisfaction lies in the ability and freedom to lo what is worth while. All this is probably more noticeable as pplied to composition work than to any other phase of education.

Writing divides itself into two lines of effort, mechanical correctness and intellectual attractiveness and effectiveness. The two all for distinctly different treatment. The former is to be secured arly, and the child should escape the terrors of uncertainty as to he "how" before he is concerned with the "what." The theory hat the child should have something to say before he tries to write, s out of date. No one can think well or write well when he tries o have something to say and is afraid that he will not say it correctly. Mechanics of writing should be automatically correct before he pupil is anxious about what he will say.

The mechanics of writing are:

Legible and easy penmanship.

Correct spelling.

Knowledge of punctuation.

Grammatical accuracy.

Good form in writing letters.

Something should be said of each of these, but the scope of the present article does not provide for enlargement. Suffice it to say, here is no good penmanship that can easily degenerate into illegibility; that every child can learn to spell correctly all words used so frequently as to make it annoying to look for them in the dictionary; that one is safe in his spelling when he knows when he loes not know how to spell a word, for then he will consult a dictionary; that the essentials of punctuation can be learned early in school life; that the indispensable features of grammar can be earned by practice before the memorizing or understanding of rules; that the important elements of good form in letter-writing are easily and early taught.

All this must be taught to every child. In this phase of the work, the less of originality the better. Loyalty to standards is the chief element of correctness. There is no appreciable freedom when it comes to the mechanics; there is little occasion for one think, provided he knows what the correct thing is and has th knowledge ever in mind.

To have adequate practice requires many devices and mu ingenuity on the part of the teacher. What is known as reprodu tion exercise, copying writing from memory and filling in blank are a few of many schemes for exercising the children in spellin punctuation, and grammar.

Intellectual attractiveness and effectiveness mean that the shall be something to say and that it shall be so said as to make readable. This necessitates that the writer have something to s that he would like to say; that he write it for some one who wou like to read it; that the thing written shall be worth while, a that he take pains to say it as well as he can.

There is no place where individual teaching is so important in this phase of composition work. In the case of mechanics, y can get on well with a large class; it is merely a matter of mu practice; but in the case of attractive and effective writing it is di ferent. Not every child can make a good writer. It is not wor while to expect to accomplish much with such a one, and abo all it is as vicious as it is cruel to grade children or to "mark" the on the basis of their ability in composition work. It is practical impossible to attain one's ideal in this direction, but this is no excu for not striving for it. There are groups of exercises which aid i this matter;

Inquiry and answer.
Explanation.
Discipline.
Opinion.
Recitation in writing.
Tests or examinations.
Research.

Writing the questions a child would like to ask, fills all the co ditions of good thinking. Asking the same question in three more different ways, the child himself deciding which best express his desire for information, varies and extends the exercise. Colle the questions and pass them about, either in the same class or in higher grade, allowing each pupil to select some question he woul like to answer or can answer. Asking and answering questio appeals to a child's thinking with the least possible conventionalit and deadening routine. Occasions for explanation frequently ari as to personal conduct or failure in work on the one hand or in co nection with processes or rules in the regular branches, and to mak a satisfactory explanation necessitates the sharpest thinking and th clearest expression.

Descriptive writing will afford the most opportunities for thoughtful exercises. Timely games open a wide field for boys. At the opening of the base ball season let the boys see who can give the best description of the ground, of the essentials of a good pitcher, catcher, batter, first baseman, second and third basemen, short stop, fielder, umpire. Thus all the games afford excellent opportunity for discriminating descriptions. Seasonable activities of nature, such as snowstorms, the fir buds, leaves and blossoms, the fruits and berries, grains and nuts, birds and animals, offer opportunities for inviting descriptive work. Of course pictures, biographies, and stories furnish limitless temptations to say interesting things. Scarcely a day passes in which there is not something happens in school, on the play-ground, or in the reports of the daily papers for interesting description. The only conditions are that it shall be something the children will be glad to write about and that they know you will look over with interest.

Children from twelve to sixteen have opinions to express upon a great variety of subjects. It is in every way a good thing for them to put their opinions into writing. Whenever you hear a student expressing any opinion with warmth, say: "Take that as your next theme." Frequently there are recitations or features of a recitation hat can be brought in in writing. Utilize every occasion of the kind for composition work, not by name but in fact.

What are usually designated as tests or examinations may easily be made of service in combining thought with correctness in mechanics. The culmination of power for the ordinary student in his writing is to be developed through research. When he is equal to t, assign some topic, the facts of which must be looked up through much research. This trains him to gather material, to take notes, o remember much that he does not note down, to estimate the relative importance of facts, to discriminate regarding the weight of authority, and to think carefully of his putting of his own judgment and opinions.

So far as possible, learning to write is not to be an exercise nor a branch of study; it is to be made an effective feature of practically all the phases of school work.

It is of the utmost importance that the teacher refrain from criticism of the mechanical correctness of the writing in which thought, naturalness or interest is sought. Make a note of any special lapses, and at another time say: "Your spelling of words that double the final consonant is often careless," or, "You must be more thoughtful as to the use of the right person and number of verbs."

Written Composition in the First Three Years of School.

By A. F. Chadwick, Principal, Paterson, N. J.

I. (1) The investigations of Tarde, Baldwin, and others, have done much to throw light on the origin of human faculty, including speech and writing. They find in the young child impulsive, instinctive, and semi-instinctive actions. This is what Froebel meant by "self-activity." The strongest force in developing the semi-instincts into full self-conscious activity is social imitation. Professor Royce, of Harvard, holds that social imitation is the means by which the child under three years of age attains to the consciousness of self, and is enabled to say, "I like" and "I see." Among the semi-instinctive acts of the child responding to the impulse of imitation we find various forms of "making," including the kindred ones of drawing and writing. Written composition begins when this activity first appears, and that is long before the child enters school at five years.

(2) In December MONOGRAPHS Dr. Hervey says: "One of the commonplaces of psychology is that precisely the last thing we get in our learning is the knowledge of the individual thing, and that the first knowledge we have or can have about anything is cursory, vague, and, in a way, general." In the same number Mr. Garlick says, on the contrary, that the fundamental sequence is "to the general from the particular." This is what I have found to be the commonplace, and a very misleading one too.

Romanes shows that the child first perceives in generic distinctions, and that the finer specific differences are of necessity distinguished later. I should say that the truth is that the mind works in a rapid shuttle-like way from the vague whole to a more distinct view of parts and back to a better determined whole. Of this much I am sure from long experience, that with the child of five years the "whole" composition is vaguely present, pressing for utterance, and that when expressed it will "find itself" in from one to four "generic" or paragraph sentences, which sentences two or three years later on will divide into more specific statements, the final elements of all composition. This is the order of growth. The logical order is the reverse. Language books try to follow the logical order of making compositions out of sentences. Hence much anguish.

This vague "whole" lies in the child's mind almost altogether unworded. The animal thinks entirely without words, the young child almost without them; the grown man, also, when dealing with common things. The words come with the act of speech or writing.

(3) Davenport and Emerson in their grammar say: "Letters are such personal things that the best work cannot be done as a class exercise." Dr. Shaw, in his book on Composition, begins with "reproductions," followed by picture stories. Letter writing is taken up much later and in a difficult form. Dr. De Garmo, in his Language Lessons, follows a similar order, and does not introduce the first letter till well along in the fourth year. Yet who does not remember his own childish delight in "printing" letters at a very early age? Froebel makes "Lena" learn to read and write at six years of age by "printing" a letter to her father.

What is the origin of either oral or written speech in the race? It is the impulsive desire for social expression. Writing is in its origin rather an expression of "likes" than of "thought." We may be sure that Fröebel is right, and that the letter more truly represents the primitive form, scratched on a piece of bark or skin, than does the "reproduction."

When the child first enters school we show him a flower, and asks him what he sees. He replies, "I see a flower." We write it on the board and have him read it; afterwards write it. To what motive, what interest, are we appealing in this act of the child's writing? That he may learn to write "like Papa?" But why does Papa want to write? To write to somebody. That is the real original, the deep and lasting social motive. So I applaud Froebel's insight in having Lena learn to read and write by an exchange of letters with her father, and I commend his thought to any conscientious kindergartner who may hesitate to introduce the "making" of letters among her most valued "occupations."

(4) There is at present a healthful reaction against requiring young children to do work involving refined motor-nervous adjustments. Undoubtedly the general order is that the large fundamental movements and nerve centers are coördinated first, and the finer peripheral ones later. But the wonderful fact is that a newborn child will clasp a rod with its hands and sustain its weight for several seconds. Here we have a marvellous perfected instinct that was of absolutely vital use to our arboreal ancestors, but which the child turns to account in his first year of life in handling a rattle, a stick, or a pencil. I believe that it is perfectly healthful for the child to scribble-write from this time on.

Colonel Parker states that one of his Normal teachers made the most interesting and valuable discovery that under the impulse of interest the untaught child will write, expressing itself in a graceful cursive script. This is the child's "scribble-writing" maturing. As Colonel Parker suggests, it is capable of rising to beauty under the impulse of desire. The child of five years will write freely in it as long as his confidence is not shattered; and what is equally important, he will read his writing correctly while it is yet fresh.

(5) So much for principles of construction. But besides "making," the child must gain the power of criticising what he has made, so as to make better. He can gain this power by exercising it; there is no other way. The growing of critical power must be begun early or the teacher will be swamped in errors; yet not so early as to check free and full constructive work. If the teacher does the correcting, it will be the teacher that will gain the critical power, not the pupils. This is the mistake that most teachers make. The best way to give the class the chance for criticism is, after the first year, to have some pupils write on the board during all class exercises in composition. All errors in these board compositions should be detected and corrected by the children of the whole class. This systematic development of the critical faculty should begin as early as the second year in school. The most numerous mistakes are those of spelling. In the case of these, prevention is the best kind of cure. If an adult, when composing a letter, is doubtful regarding the spelling of a word, what does he do? He asks someone for the correct spelling or consults a dictionary. The little child cannot consult the dictionary. He should be encouraged to ask the teacher. She should write the correct form for him on the board. To force a child to misspell is to outrage his mind.

II. Having glanced thus at some important principles, let us apply them in a brief criticism of the best prevailing methods. Methods advanced by such thinkers as Dr. De Garmo and Dr. Shaw may be conceded to have marked excellencies. On these I shall not dwell, but for the sake of brevity point out what I consider to be a few vital defects.

Dr. De Garmo's book starts composition in the third school year. The first exercise is entitled The Foolish Mouse. A picture is shown with a mouse looking at a trap baited with a piece of cheese. The teacher asks a series of eight questions: "What once came to a trap? What was in the trap? How did the cheese smell? Who wanted some of it very much? What did he think he must do? What did he touch it with? What happened? Who was caught?"

The children write the appropriate answers as each question is asked, with this result:

THE FOOLISH MOUSE.

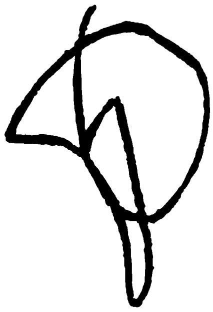
"A little mouse once came to a trap. There was some cheese in the trap. It smelt very good. The little mouse wanted some of it very much. He thought he must smell of it. He touched it with his nose. The trap was sprung. The mouse was caught."

This seems a very good result. But what have the children done? Compose? Not at all. They have had an exercise in turning words around from questions to answers. The teacher did the composing. There should be four paragraphs, but teacher and children are alike unconscious of the fact. The proper motive for composing is conspicuous only by its absence. As the teacher did the composing, she too will do the correcting.

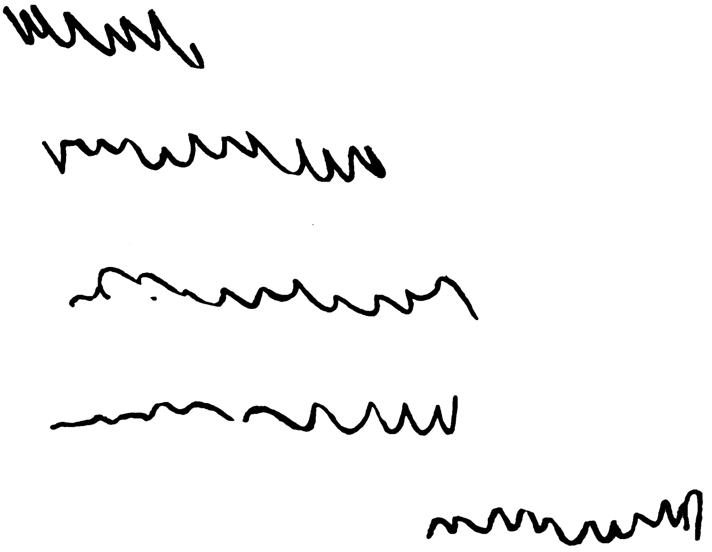
Dr. Shaw begins with reproduction. This gives as a whole what the other develops by parts. This is a gain; but there is more room for mistakes in detail and the picture adds interest. It differs mainly, however, in being more of an exercise for the memory. There is no composition and an inferior motive.

In the latter part of the fourth year Dr. De Garmo's book takes up letter-writing. Here Dr. De Garmo falls back on a dead lift by the memory. The letter contains seventy-six words. The child is directed to learn this letter and reproduce it from memory "with the utmost exactness." The teacher is to help the child get the correct form. This letter, like the story, is written solid, although there are four paragraphs. I venture to say that where a class is allowed to write solid for a considerable time, there will grow up such a tangle of errors that it will be as easy to straighten them out as to cut paths through a cypress thicket. The teacher again does all the composing, and will do all the correcting; the children will recopy. Every teacher knows what the result will be, notwithstanding the direction for "utmost exactness."

III. So much for brief criticism; now for some positive construction. Let us start again from Froebel's standpoint. A child of one year, who has seen its parents or the older children writing, will take a pencil and paper and write a letter something like this:



This strong, free, impulsive stroke is the primitive graphic form from which is developed genetically the arts of drawing, composition and writing. Whatever is expressed in the above composition is wordless; certainly not without mental images. Very vaguely through the act of expression the child reaches a little better understanding of what he saw the others do. This social education in writing goes on, and has acquired considerably more form and content when the child of five years first comes to school. Then, under the same impulse, encouraged by the teacher, the children will write, in the beautiful scribble of which Colonel Parker speaks, letters to mama or Santa Claus, something like this, and reads it:



Dear Mama,

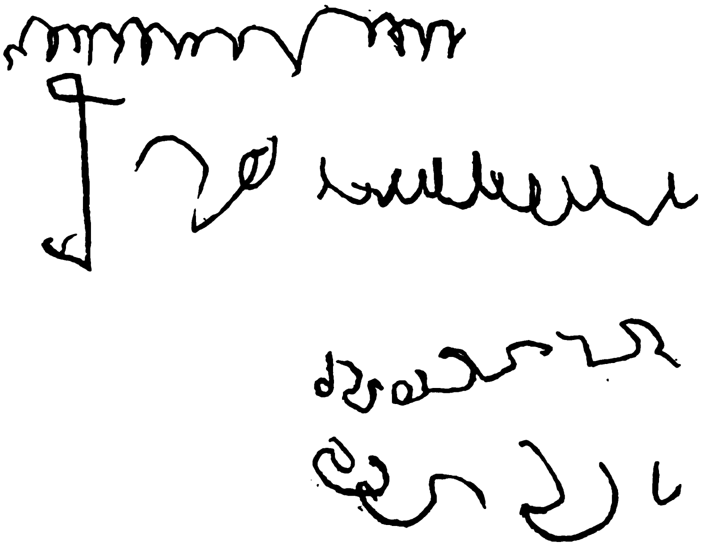
I like to go to school.

I can spin my top.

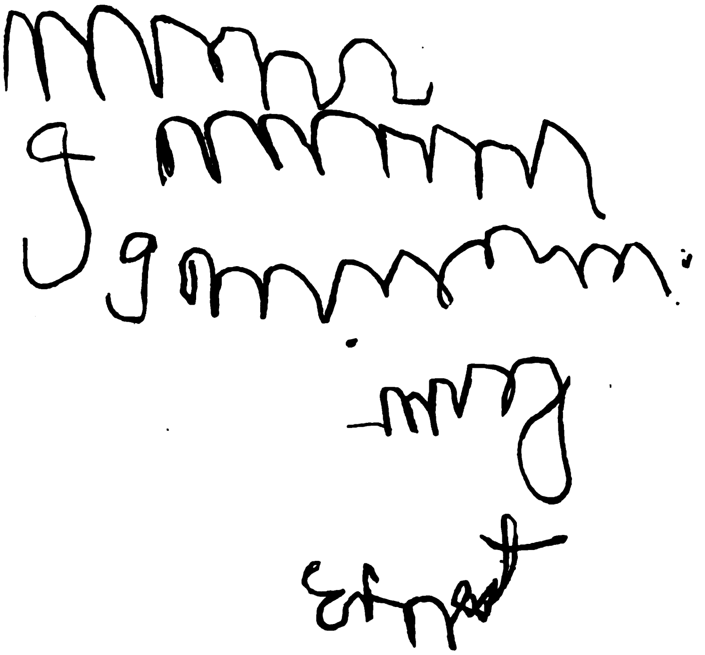
Your little boy, Willie.

(five years old; one month in school.)

It is important for the teacher to praise all who can read their letters, especially those who have exactly as many lines as there are pulses, and gently to restrain those who scribble many lines without "stories." The teacher should copy as read the most interesting letters as a basis for reading and writing lessons for the class. The teacher should be careful not to imply that her own handwriting is much different from or much better than that of the children, lest she check their confidence and freedom of composition. It will not be long before some of the letters will look like these:



Dear Mama,
I like to go to school.
Your little boy,
John.
(five years old; two months in school.)



Dear Mama,
I like to spin my top.
I like to play ball.
Your little boy, Ernest.
(five years old.)

Note that the word "I" is emerging definitely. The child's name in the second signature has taken shape. If reading and copying letters from the board is correlated, it will not be many weeks before many of the class write correct original letters in great variety in coarse adult script. A first year class will ask for twenty or thirty words during an exercise.

The teacher should write all sentences on the board as paragraphs, with an indentation of one foot. When children have reached the adult form of script, they should write all sentences with a paragraph indentation of two inches on eight-inch paper. During the first year, I should advise that no formal subjects be taken for composition; that all compositions be letters to Mama, to Papa, to the principal, to the teacher in the next room, to playmates, to Santa Claus. Have letters at Thanksgiving, for Lincoln's and Washington's Birthdays, for Arbor Day, and vacation. While writing is in the scribble stage, I should advise paper about four inches square. Here are three kindergarten letters written at first hand in adult script without any kind of mistake:

'Dear Mama,
I have a red top.
I can read.
Your little boy,
Abie" (five years old)

"Dear Santa Claus,
I want an engine.
I want a ball.
Your little boy,
Henry" (five years old)

"Dear Mama,
I like to play.
I like to go to school.
I like a nut.
I like a seed.
Your little girl,
Rosie" (six years old)

When free composition in good form has developed so far, there should be no further difficulty. Very few sentences will appear in the first year too long to go on a single line. When they do occur the teacher should show the children how to begin the second line of the sentence at the edge of the paper. Gradually, children as they finish their exercises should be called to the teacher's desk to correct any slight errors that are found. At the end of the first year, compositions like the following may be expected:

"Dear Miss Ritchey,
I like you.
I have a doll and a go-cart.
We have a little baby.
Pussy willows are out. Do you like pussy willows?
Your friend, Kittie Peckhardt"

In a set of thirty-three first-hand letters written by a class at the end of the first year I find twenty-three mistakes in all, mostly minor ones. The children asked for thirty-five words.

In the second year the children are ready to branch out into more formal compositions on nature, biography, and holiday subjects. Board composition by pupils, with free pupil criticism, should be begun and continued regularly. Occasionally a paragraph will now divide into two or more specific sentences. Show the children how to continue both sentences in one paragraph form. Here are two second-year compositions:

"Snow.

The snow is very white.
The snow keeps the flowers warm.
The snow comes down like stars.
The snow is very cold.
I like to make a snow man. I like to sleigh-ride.
Henry Stapert"

"George Washington.

George Washington was not a poor boy like Lincoln.
He had a good education.
He was a good brave man.
He had a good home.
He never told a lie.
When he was a man he went to war. He was almost shot.
When the war was over he was made president of the United ates. Nick Kontilena."

The third year is marked by the development of the paragraph. ith most pupils now it divides into two or three sentences. The ain work of teaching and criticism will be to guide it into proper rm. Many single-sentence paragraphs will remain, however, en to adult composition. Geographical subjects may be added th great interest. Here is a third-year composition:

"Pen-se.

Pen-se lives in China.
She lives in a boat. On the boat are ducks. Every morning ey go into the river to swim.
Her brother has a long braid, and it hangs over his jacket.
Pen-se's brother is a fisherman. He works for his uncle. Pen-se lps her mother.
Pen-se drinks tea and eats rice with chop-sticks.
Tea and silk come from China. Addie Wyckoff"

In writing on Pen-se the class asked for thirty-five words. No o compositions are alike. "Unity" generally takes care of itself. here it is violated the class should criticize. With biographical mpositions the teacher may begin to discuss the natural order of e composition in advance of writing. My custom is to have a ter or composition each week in every class. I expect work to be ne well at once. If composition work is not done at first hand correctly as is other school work, something is wrong. If the cher has to "take it home" more than she does other work, ain something is wrong. Of course really shiftless pupils should opy as a penalty. I have very little recopying, and almost no rrecting by the teacher outside of school hours. Composition rk is our most joyous school exercise.

The Story and the Poem in Primary Grades.

By SARAH LOUISE ARNOLD, Supervisor of Schools, Boston, Mass.

THE primary school is still a school for little children. No one desires to make it a high school. Nobody imagines that primary school children are to master all the sciences and the arts named. The present condition of affairs is the result of an attempt to substitute for the old school tradition, one more in harmony with the normal growth of the children. We no longer believe that the child goes to school merely to memorize facts gathered from various fields of knowledge. We recognize at least two distinct aims of the school; one to impart knowledge, and the other to develop taste and establish tendencies.

The second function of the school can hardly be stated in very definite terms nor gathered into statistics. We have been accustomed to test or measure the pupils by discovering how many facts they had learned, and the result, tabulated in examination records, has been comparatively soothing and satisfactory. To gauge tastes and tendencies is not so simple a matter. And yet few of us when considering the children dearest to us, would hesitate to choose between the knowledge of the facts of percentage and the tendency to apply this knowledge in honest dealing with one's neighbor:—the power to pronounce and to spell words upon the pages of the school reader, or this power plus the added tendency to love and to choose good books. The tendency to apply knowledge in right action, the cultivation of taste, are subtle, intangible and immeasureable results of right training, but they are of great positive value. We are no longer satisfied with the teaching which emphasizes the acquisition of facts and ignores these weightier matters of the law.

This change in our unit of measure accounts for the modification of our school curriculum. The mistakes which we make in this experimental stage are due not so much to a fault in our theory as to the general misapprehension of the purpose. Studies in animal and plant life are introduced into the primary school not for the sake of doing in the fifth year of the child's life something which will shorten his course in zoology in the sixteenth and thus save time. Not at all. The purpose of such simple study as the primary school affords, is to open the eyes of the children to the animal world about them, to establish interest in the great field of nature, to develop the power of observation, of thoughtful questions, of reverent appreciation. The fact side of the result is almost infinitesimal; but if the instruction is wisely given, the subject will make its contribution to a useful body of knowledge, and the taste and tendency will continue as most helpful factors in the future life of the child, increasing his happiness as well as his power in life.

Keeping in view, then, this double aim of the primary curriculum, and turning aside from the other subjects, let us consider for a moment the introduction of literature into the primary school. We shall remember that the object is not to add one more subject to the program; not to acquaint the children with additional facts, but to develop a liking for good literature so that the power acquired in reading shall be made to contribute to the highest growth of the pupil.

Remembering this, we shall recognize that the stock of primary school literature should not be limited to that which the pupil is able to read. If we wait for him to master the first, second, and third readers before giving him a taste of good literature, we shall have lost the most impressionable years and shall have relinquished our greatest opportunity. Childhood experiences are most tenacious. What the boy learns to love, the man readily pursues. "As the twig is bent, the tree is inclined." Without waiting for the child's mastery of word, letter, and sound, the wise teacher will proceed at once to acquaint him with the best things to be found in books—best from the child's point of view as well as from the critic's;—the true stories of history, the ever new folk-lore tales, the ballads and the poems which belong to childhood the world over.

In the first year of school this instruction can be given in the story hour, an essential part of the primary school program. Whatever else is omitted from the list, let the story hour be retained. 'Tis the natural heritage of the children. This hour may come in the early morning when the children are fresh and bright and the teacher is in the best mood for story telling; or when the drill with pencil and paper or with the curious hieroglyphics upon the blackboard has wearied the young seekers after light, let relaxation come through the story hour. Or let it be the last fifteen minutes of the day, just before the children go home from school. Let them have this "good time" before they go;—send them home happy.

In the story hour let us tell over and over again a few simple standard stories. Let every good type be represented. The true story of cunning and daring that stirs the hero in every boy's heart;

the fairy tale that gives free rein to the imagination bearing the children to the realm where all goods things prosper and the bad meets its inevitable discomfiture; stories from mythology which have grown out of the child-faith of the race; and the poem, with its appeal to the child's own love of rhythm and melody.

There is a large field from which we may choose. Hans Andersen's fairy tales, taken all in all, are the best for children. Their simplicity, their imagery, their quaint humor and their sound sense are attractive to young and old alike. Some of the Grimm collection, the least fantastic and barbarous, are well suited to school use. Mr. Scudder has gathered together in his "Folk Lore Stories" some of the standard fairy tales told in choicest English. For the true story there are numberless books of tales. Among them just now the Indian stories are predominant. These always fascinate children. Stories of colonial days may be added and bits of biography taken from the lives of the heroes whose names are known to every American household.

For the poem, the teacher must lean to her own taste and be governed by her own discretion, for here more than in any other field, personal love for the subject is indispensable. Such lessons can hardly be prescribed by another. They must well forth from one's own experience. The ballad which was sung to us in childhood, the poem which our elder sister repeated over and over to the listening little ones in the twilight, the hymn which has always been our precious possession,—these we must inevitably give to the children, and we shall add the other poems that we like best:—"In School Days," perhaps, with its sweet picture of child life; Mary Howitt's poems of fairyland; the simple verses of the Cary sisters, and the charming nonsense rhymes of Eugene Field and Robert Louis Stevenson. The field is limitless, and here we may wander at our own sweet will.

How shall we teach them? First of all by making of the story hour "a good time," so endorsed by the children. Secondly, by telling the story or reciting the poem rather than by reading it, so that it seems our own and is real to the children. Then there is no barrier of a book between the teacher and the class. Thirdly, by repeating the favorites again and again. Fourthly, by talking freely about the characters and the scenes as virtual parts of the children's world. And lastly, by giving the children the opportunity of standing upon the platform by the teacher's desk and repeating the story or the poem to the school. We may be sure that their memories hold these treasures, however treacherous they may be in the case of the multiplication table.

In the second grade the children are beginning, let us trust, to *read* good literature. Some of it is simple enough. Whenever we can, let us substitute it for the newspaper English or for the reading-book sentences which came into being in order to frame a certain word of certain sound. And here in the second grade the children will memorize short poems, and recite again and again the short fables which are complete wholes and are not too long for frequent repetition. In the third grade we may teach the poem, stanza by stanza, discussing the words and phrases and fastening them into the child's vocabulary with their new content of meaning. Now the poem becomes a language lesson as well, entering into the child's speech and expressing the new thought which has been added to his experience. Now the teacher will read the rhyme again and again, stopping often for conversation with the children, yet sometimes "without note or comment," and after frequent reading the children will recite it from memory.

The story may also contribute to the language lesson. Facility in expression may be gained through such practice if the teacher thoughtfully plans her work. The power of connected narration or description, with careful and orderly arrangement, will result from this story-telling. Cards may be used upon which the outline of the story is written as a help to the first story-telling. Criticism of the order of telling will hold the attention of the children upon the natural sequence in narration and pave the way for the study of the paragraph later. But these items should be subordinate to creating a liking for good things and the tendency to choose them.

The writer has little confidence that any detailed list of poems or stories can be made helpful to all the teachers of a large city. A poem which is eminently suitable to the first grade of a certain district would be highly objectionable in another. One can readily imagine districts in which the Christmas hymns must be selected with great care owing to the religious tenets of the parents, while other districts might be named in which the sea and the field and the forest are so foreign that the story of human life must predominate over the tale which treats of nature and her marvels. Shall we not trust that every teacher in her own district and with her own class has sufficient judgment to choose from the general field that which is best suited to her children? Only let her be assured that the great aim of her work is constantly in her mind and that every lesson tends towards the goal which she clearly recognizes. Let the story, the fable or the poem coax and beguile the children toward the Land of the Good Book, and prepare them to revel in its delights.

First Year Conversation Lessons:—Stories Related.

By Harriet M. Dean, Instructor, New York City.

WHEN a child commences school in this great city, in many cases he is but five years old, and frequently has never before been away from home alone. The new world of school appears curiously strange to him. If there be no kindergarten class with its games, songs, and stories—those stepping-stones of childhood to knowledge—we must, as far as possible, endeavor to make the work of the first year conform to the child's past pleasurable experiences. Upon the introductory days of school life really rests much of the success of the scholar's future school career.

What child is there but is fond of a song? In this introductory class a bright and energetic teacher will, by tact and cheerfulness, make the embryo pupil happy by frequent singing of familar songs; and it will not be long before, even the timid child, will lend his glad little voice to swell the tune. Hand in hand with the love of song is the child's eagerness for stories. Fairy tales, the myths that are the treasures of the ages, are well adapted to the childish consciousness, in which imagination—that capacity for fanciful creation of new ideas and images—abounds. If we pause to consider, we find that mythical tales possess the framework of history, science, ethics, and religion.

The child, while often possessing quite a knowledge of language, may yet have only vague ideas of the great world of fact and reason. It is, therefore, his imaginative power that furnishes material upon which to build a foundation for higher work. At home his demand for stories has, in all probability, been gratified. Let us, then, begin our new work by enhancing the knowledge he already possesses, and keep his interest and attention by the aid of fairy tales, folk-lore stories, fables, and rhymes similar to those we suppose him to have heard. Let him find something akin to home life in his first school days. Should you have forgotten childhood's favorite stories, read them and renew your love and interest for them; you will then see how well suited they are to the little child's understanding.

During the first few months of 1-A work, let us find time to interest him with simple tales. Commence, perhaps, with a fairy story, a familiar one. The familiarity of the story will attract and hold the attention. To aid us in this, we must cultivate this art of story-telling. Tell them in an animated manner, if you wish to reach and interest the hearer. Your version of the tale may differ from his; thus the child will be roused to question you, and may be led to voice his own ideas spontaneously.

If a child's environment is such that he has not become familiar with these, the first steps in literature, then all the more important is it for the teacher to aid him by easy stages. Let the pupil's wishes guide for awhile in the selection of stories; perhaps, at first, he will ask for the wonderful tale of "Jack and the Bean-Stalk." We, in our generation, personify difficulties and rejoice to see the downfall of many giants, quite as formidable to us, as those of childhood's treasured myths.

As soon as the small scholar acquires confidence in expressing himself, then it is easy to lead him on to stories that you consider best for his growing intelligence. It is not at all necessary that the child exactly understand the moral that we wish to convey; let him gradually absord it. Lead him by means of carefully thought-out test questions to relate in his own words his own ideas.

Do not pursue the same line of subjects; vary it frequently. Interrelate with nature lessons; use drawing frequently as a mode of expression. Let the weekly plan contain a fairy tale, a true story, and often a poem. There is much to be found in good literature appropriate, and that will add greatly to the child's vocabulary. The many and beautifully illustrated first year books supplied so bountifully to our schools of late, are exceedingly valuable in this work. Andersen's and Grimm's Fairy Tales, and Æsop's Fables should be in constant use. True stories from history about Washington, Lincoln, and Grant; the origin of Independence Day, Thanksgiving Day and Decoration Day. Cary, Thaxter, Field and Stevenson have written much that will be available. Whittier, Lowell, Emerson, Longfellow, Tennyson and even Browning have, I know, been drawn upon for material that a 1-B class understood and appreciated, and which will remain an influence for good when school days are long passed. Material must be carefully selected. The aim of these lessons is not only to lead the child to fluency of expression, but to foster in him a love for the good and beautiful in literature.

A Reading Lesson Based on a Song Previously Taught.

By Amy Kahn, Instructor, New York City.

In the Branches of a Tree.

In the branches of a tree
  Is a bird, her nest preparing,
Laying in two little eggs,
Coming out two little birds,
Calling their mother, peep, peep, peep.
    Mother dear peep,
    Mother dear peep,
    We love you dearly,
    Peep, peep, peep.

—*An old German Song.*

One morning, as the children entered the classroom, they were surprised to find one of their favorite songs illustrated upon the blackboard. (Illustrative drawing not reproduced here.)

The teacher called upon the children to sing the song the picture told. Enthusiastically was sung "In the Branches of a Tree."

The children were asked to tell what they saw. Their stories were placed upon the blackboard.

The "nature work" claimed its share; the facts developed were:

That there was a bird.

That the bird was in the branches of a tree.

That the bird was preparing her nest.

That in the nest there were two little eggs.

Questions brought forth how nests were constructed; why placed in a tree; in what part of the tree; when the nest is ready; what happens; what becomes of the eggs; how many eggs there are and into what do the eggs develop?

All these statements were clearly given by the children. They expressed in a natural way the thoughts gained from the picture.

The teacher felt what the picture meant to the little ones.

The development work was now completed, but the language and nature work were still brought into play. The children's stories, previously put on the blackboard, now served as a basis for the reading matter.

Some of the stories as given by the children were:

I see a tree.

The tree has branches.

I see a nest in the tree.

The eggs are in the nest.
The nest has two eggs in it.
I see two little birds.
The two little birds come from the eggs.
I like "mama bird."
She is good to the baby birds.

The teacher's aim is to have more conversation without any help steps. The child is to be independent. No questioning is to be done.

To maintain the interest, a "Chatterbox or Little Talkers' Club" had been formed. Each child was a member and was called upon to say something.

How can we better know the ideas that have been formed in the child's mind than by allowing him to give his thoughts oral expression?

The original stories were erased. The teacher's aim was to have the children embody the thoughts in the author's words of the song.

The words were written in correct form, pains being taken to give a good picture of the written word. The children again sang the song. Then they repeated the words as if the selection were a recitation. The essential points of the life history of a bird were thus impressed upon the children's minds

The words pointed to were recognized by the children; the teacher tested the child's power of "Picture Art Taking of Words" by writing on different parts of the board, regardless of their position in the selection, the words she thought the children should at this stage know. A little time was again given to nature work. The family life of birds was told and the point was made clear that in the nest, so small a place for a family, the birds still found room, huddling together under "mama bird's" protecting wing. Here the opportunity of speaking of the universal "mother love" presented itself.

As a summary, a pantomime play was introduced. One child pointed to the drawing on the board and silently showed the thoughts gained by pointing to:

The branches of a tree.
Mama bird, its nest.
The eggs and the little birds.

The children's attention was again drawn to the written selection. They were asked to point to different lines, spoken of by the teacher, who was careful not to ask for them line by line as in the selection, as this would have been simply a memory test and would not have given an idea of the thought that lay back of the words. Words must generate thoughts; they are not to be mere empty forms.

Recitation of Nursery Rhymes and Poetry.

By Frances Lillian Taylor, Instructor, Galesburg, Ill.

A GREAT message, whether told by picture, statue, poem, or story, carries with it a silent power. Belief in this truth has brought new forces into the schoolroom and has put new tools into the hands of the teacher.

Those who have entered upon the fascinating study of the power of right beginnings in any department of education are watching the influence of great things upon little children. Although it is impossible to tell what will be the effect of any one great work upon an individual child, yet in dealing with classes of children there are certain results which may be looked for with implicit faith.

Let the mind be awakened and interest aroused, and all education becomes easier. One child is attracted by a beautiful picture. Another becomes interested in his school work through literature. Some minds are aroused by nature study, and others are reached through music and song.

Kindergartens and primary schools alike are becoming less mechanical in their work. Through nature and art, game, songs and stories, our interest is awakened in the beginnings of every science which appeals to a child's desire for knowledge, or his love for the beautiful or the wonderful. Margaret Sangster has expressed this thought in the lines:

"My laddie, my laddie, you are scarcely six years old,
But the ages have been garnering the wonders you shall know."

But of this great legacy of the past there is nothing so easily obtained, so far-reaching in its influence, and so practical in its relation to the essentials of education as literature. Among the writings which the world has chosen to remember, there are uncounted riches for the children.

Much of truth is contained in the theory that the child repeats, in his development, the history of the race. Rhythm and poetry were the earliest beginnings of literature. As these forms of language appealed to the early races, so they appeal to the child. Just as the language of different peoples has been purified and beautified by the songs of the wandering poets, so may the vocabulary of the child be corrected and enlarged by the memorizing of beautiful poems.

In the realm of nursery rhymes, as in every other field, we find some choice flowers and many weeds.

Mother Goose presents a few jingles which have become classics, and which every child should know long before he enters school. Little Boy Blue will always be loved. The cow that jumped over the moon, and the old woman who lived in a shoe are perpetual fun makers. Mother Hubbard's wonderful dog belongs by right to every child. The Pussy Cat who could see only a mouse in the palace of the queen will be interesting so long as she has a counterpart in life. Bo-peep presents a charming picture as she stands with her white sheep all about her.

Then there is the wonderful Blackbird-Pie, the mystery of which has never been satisfactorily cleared away. And the babies which rock in cradles on the tree-top have taken on new interest since nature study has pointed out the "baby leaves in cradles brown," and the hosts of butterfly cradles which rock when the wind blows.

For rhythm and cadence the ballad of poor Cock Robin possesses a charm that will never die. Who has so entirely forgotten his childhood as to feel no thrill of sadness on hearing the words:

"All the birds of the air
  Fell to sighing and sobbing,
When they heard the bell toll
  For poor Cock Robin."

It is only by wise selection on the part of parents and teacher that the best poems and rhymes can be given to the children. Even in babyhood is time lost by the reading aloud of poor literature. Many a mother has put her little one to sleep by the mere rhythm of a beautiful poem.

One of the best collections of nursery rhymes is found in an inexpensive little book entitled "Verse and Prose for Beginners in Reading." Here are the choicest selections from Mother Goose, several of Frank Dempster Sherman's beautiful lyrics, William Blake's best efforts, Wordsworth's poems for little people, and a goodly number of poems from that prince of nursery rhymers, Robert Louis Stevenson.

While the chief aim in teaching the child to memorize poems is to cultivate his taste for good literature, yet this exercise may be of the greatest aid in learning to read. One has only to train the child to follow with his eye the printed or written lines while he is repeating them and many a new word will thus be unconsciously learned. If one or more of the leading words in each line is selected and taught in the word drills, these words will suggest the whole line and thus ear and eye will supplement each other. Daily exercises of this character show astonishing results in the number of new words which the children are able to recognize at sight.

While word drills and phonic drills have a place, and a large place in the teaching of reading, yet the most pleasurable lessons in the acquisition of this difficult art may be the periods devoted to the memorizing of poems. That this proposition is reasonable and according to nature is shown by the many instances of bright children teaching themselves to read by repeating the rhymes and poems which have been read to them from their nursery books.

Not only may the taste for literature be developed at an early age by the memorizing of poems, but good expression may be taught. Here is an opportunity for the teacher to give the child the benefit of hearing good oral reading. She has only to visit a number of reading classes in different schools to observe that a child's oral expression, as a rule, is more largely influenced by the reading of his classmates than by what he feels or understands.

The consideration of this subject would be incomplete without mention of the poems and rhymes connected with nature study, the seasons of the year, and the special days which are noticed in our schools. Many of the kindergarten songs express in simple and beautiful language a child's ideas about birds and flowers, wind, sunshine, and rain. They fill his mind with pure and beautiful thoughts and they make clear, definite, and joyous the reasons for the celebration of our great festival days.

In the kindergarten and the primary school a morning song greets the sunshine. Does an April shower fall? With the tinkle of the raindrops is heard the music of the words:

"Wonderful rain! sparkling rain!
Falling pit-pat on the pane,
Our Father in Heaven the pearly drops sends,
And the sunshine that follows the rain."

When the welcome first snow falls, all work stops and the children sing of the little white feathers that fill the air, or tell of the falling snow stars.

Such rhymes enter the child's heart and become a part of his thought and language. A child of four years, looking one day at the growing plants in the garden, quoted these words from a song learned in the kindergarten:

"High and higher still it grows
Through the sunny hours,
Till some happy day the buds
Open into flowers."

A mischievous urchin of six years passed a birch tree in his play. He held out his hand toward the tree, exclaiming:

"Give me of thy bark, O birch tree!
Of thy yellow bark, O birch tree!"

Again, when the teacher pinned a brilliant yellow leaf upon the wall, he repeated, as if thinking aloud:

"Like a faded leaf in autumn,
Like a yellow water lily."

Nursery rhymes, songs, memory gems, and poems,—how they brighten the child's life and make rich with beauty the school work which once was mechanical and wearying to both pupils and teacher.

Since the one is included in the other, no sharp line can be drawn between nursery rhymes and poetry. The jingle prepares the way for the longer poem just as Stevenson's shorter and simpler rhymes introduce the longer poems which are found in his beautiful "Child's Garden of Verses."

With the presentation of complete poems some interest should be aroused in the writers who have given so much pleasure by their verses. What author shall be honored as first on the list to open the way for the child to the attractive fields of poetry?

A true child's poem will not express grown people's thoughts about children. It will speak the language of the child heart, interpret its joy in words, and assist its wildest flights of imagination. The ideal child's poet will write with such purity of diction, such originality and beauty of language, that his work will take an unquestioned place in the world's best literature. Of all the writers who have been sometime called "The Children's Poet," who has done this so fully, so perfectly, so exquisitely as our own poet and story-teller, Eugene Field?

The three year old boy begs his father to read Bumpville for—

"Its bumptybump and its jiggtyjog
Journeying on to Bumpville."

The baby smuggles down on its mother's shoulder to the music of the lines:

"Nestle closer up to me
In your pretty cap and gown;
Don't detain
The Shut-eye train!
'Ting-a-ling,' the bell it goeth,
'Toot, toot,' the whistle bloweth."

Indeed, the children know that

"Shut-eye town is passing fair,
Golden dreams await us there."

Happy the primary teacher who has discovered the power of that blessed little book called Lullaby Land. Are the children dull and do the lessons drone along with lifeless and indifferent pupils?

Then read of the Sugar Plum Tree, the Chocolate Cat and the Gingerbread Dog.

Does the thunder roar and are the little ones afraid? Let them listen to the "Dinkey-Bird that singeth in the amfalula tree" till

"Their hearts get light and lighter,
And their cheeks are all aglow."

Are they prone to waywardness? Read of Good Children Street and each little child will become possessed of a great desire to have the aisle upon which his desk is located partake of the characteristics of the thoroughfare noted for goodness.

Is the day long and weary for the little people? Let the Rock-a-by Lady be called from the magic land of Lullaby. Laden with poppies and beautiful dreams she cometh. Long rows of little heads sink on the desks in fancied slumber, while they listen to that poem beyond compare. The imagery of drums, trumpets, popguns, and tops carries every laddie straight to a boy's paradise. When

"Dollies peep out of those wee little dreams"

smiles of infinite satisfaction steal over the little faces. Then the sleeping children are losts in the mists of fancy. They are no longer in the schoolroom. They have flown to the heights

"Where the Mother Moon beams
And the fairies go winging."

But when restlessness and mischief are abroad, let the teacher try the effect of that poem—at once the sweetest and the saddest—Little Boy Blue. A hush steals over the room. The children turn to their neglected work, all mischief forgotten. They are thinking of the "little toy friends"

"Awaiting the touch of a little hand."

They, too, are wondering

"What has become of Little Boy Blue,
Since he kissed them and put them there?"

In the charming little volume which tells of Eugene Field in his home, are the pictures of the poet and his family. The children are eager to see the beautiful home under the trees where their loved writer used to live and the room where he wrote the verses they enjoy. They never tire of hearing how he played with his children. Posy, Daisy, and Little Sister Girl are schoolroom names, and the poet who played in such delightful manner with his own little ones is a friend whom they can understand.

And thus the study of authors is begun and the best literature which is suited to the nature of a little child, becomes a practical and an uplifting factor in his education.

Memory Gems and Short Poems in the Primary Grades.

By Caroline Harriet Smith, Instructor, New York City.

IN the selection of these poems, there are three factors to be considered:

1. In the first place, there is the child, with only a childish intellect and only childish emotions. He comes to us with a mind filled with experiences of various kinds, few of which are particularly elevating. His emotions are of the crudest kind. Often his surroundings count for anything except the best which life holds for us. He has little appreciation for the beautiful. His life perhaps has been filled with play, perhaps hard work has already left its imprint on his singularly old yet childish face.

In any of these cases we have a great work to do, a great light to reveal to the seemingly beclouded mind.

We must needs give to him a foretaste of the beauties and pleasures and inspiration of the world's great master poems, which later on he is to learn to love.

2. There is also to be considered the great field of literature.

When we look upon the great mass of material, some good, some bad and some indifferent, we seem, at first thought, to be at a great loss; there is so much at hand, and our limited time permits of our choosing only a small amount.

The last two classes mentioned can be let severely alone, for life is far too short to be spent uselessly and worse than uselessly in mastering anything but the best. However, there can be a surfeit of even the best literature. In the lower grades, one memory gem and one rather short poem taught per week seems about the right amount.

3. Lastly, there are the demands of society, the environment to which the child must be adjusted.

Let the surroundings be what they will, there must be an adjustment. When the individual can rise above it, let us gladly aid him to do so.

Good and pure thoughts, high aspirations and noble motives will tend to make one superior to his environment. In many places this is most necessary, for example in our down-town schools. While on the other hand, a lack of such knowledge keeps one in the same old rut or often causes one to retrograde. We look with pity upon one who has no high ideal, and who does not even try to reach some height.

In any walk of life an aimless attempt seldom succeeds; so in the selection of poems, this is the first great thing to be considered.

Without a definite aim in view the choice of poetry would result in simply a chaotic mass of more or less value.

It is generally conceded that the great aim in teaching literature is to furnish rich thoughts. In the study of poetry, then, the thought side should receive the most attention and all other aims should be counted as inferior to this one.

Now right here comes the old controversy. Some people loudly proclaim that only such poems as can easily be comprehended by the child should be taught. On the other hand, others reason thus: "Perhaps the child may not now understand all of the sublime thoughts revealed in our best literature; perhaps his emotional side is not yet developed so that he can appreciate their beauty in its entirety; yet for that reason we have no right to bar from his view those poetic treasures which are indeed well called gems, these precious thoughts, some of which have descended to us from far-away generations, and all of which have been written by the inspired hand.

Let us rather argue thus: "Childhood is the time when anything is most easily committed to memory. What later seems an endless task, to the fresh mind of the child amounts to nothing. Therefore let not youthful days depart without laying in a golden harvest of beautiful thoughts. Then, too, many children leave school early, and afterwards have little opportunity to come in contact with such literature. So let us then give them gems of the choicest prose and poetry, selecting, as far as possible, such as come within their comprehension. A child's field of thought at the best is very limited; let us put into the reach of his vision such things as will make his life the better and happier.

Some teachers fail to have any ideas of this sort, and teach most senseless rhymes. A single example will suffice. One of the poems quite commonly taught in the 1-A grade is this:

"Once I saw a little bird come hop, hop, hop,
So I said, "Little bird will you stop, stop, stop?"
I was going to the window
  To say, "How do you do?"
When he shook his little tail,
  And far away he flew.

Can any one tell the possible use of such poetry?

Another aim in teaching literature is to bring before the c dren beauty of style and rhythm. Selections from "Hiawath "The Barefoot Boy," "The Brook," etc., illustrate this very nic With small children many of the Mother Goose rhymes serve same purpose.

The little ones have, as a rule, vivid imaginations. This po be increased by working with many of the imaginative poems. ng this line is the poem, written by Emily Dickinson, beginning, 'll tell you how the sun rose." Then, also, Fields' "Wynken, nken, and Nod," and many others.

As has been mentioned before, it is all important to come in tact with good authors. The habit of reading good books must formed in youth. Some one has said, "The only way to form a it is to start at it with vigor, and having started keep at it." us to instil a love for good literature, one must lead the child to m such a habit.

In dealing with poetry which appeals to the emotional side, we st proceed with great care. Among such poems are "The Bare- t Boy," "The Village Blacksmith," etc.

In choosing the poems, it is well to have them correlated as ch as possible with the other studies. They can easily be chosen th reference to the nature work. "Wilson's Nature" gives a ry good list of memory gems suitable for the nature study.

The short moral truths, as "It is better to wear out than to st out," should be taught as occasion demands.

Another important factor to be taken into account is the use of tor activity. While the recitation of poems does not imply an ateur theatrical performance, yet great care should be taken as gards the manner, the voice, gestures, and enunciation of the pil.

As an illustration of the method of teaching a memory gem, I ill take up very briefly Eugene Field's poem, entitled

THE ROCK-A-BY LADY.

The Rock-a-by Lady, from Hushaby street,
Comes stealing; comes creeping;
The poppies they hang from her head to her feet;
And each hath a dream, that is tiny and fleet—
She bringeth her poppies to you my sweet,
When she findeth you sleeping!

There is one little dream of a beautiful drum—
  "Rub-a-dub!" it goeth;
There is one little dream of a big sugar-plum,
And lo! thick and fast the other dreams come
Of pop-guns that bang, and tin tops that hum,
And a trumpet that bloweth!

And dollies peep out of those wee little dreams
With laughter and singing;
And boats go a-floating on silvery streams,

And the stars peek-a-boo with their own misty gleams,
And up, up, and up, where the Mother Moon beams,
The fairies go winging!

Would you dream all these dreams that are tiny and fleet?
They'll come to you sleeping;
So shut the two eyes that are weary, my sweet,
For the Rock-a-By Lady from Hushaby street,
With poppies that hang from her head to her feet,
Comes stealing; comes creeping.

Read the poem through, so that the pupils may get the beauty of its style. Ask them to mention things in it which they consider beautiful. Then talk over the poem as a whole. Get the children to express the thought in their own words. Talk about the figurative language used. Lead the pupils to see how much more beautiful the thought is as Field has expressed it than it would have been if it had been written in plain every-day prose. Speak of some of the more obscure expressions, such as "The poppies they hang from her head to her feet." Ask why poppies are spoken of rather than daisies or lilies. Let the children discuss the dreams that are suggested in the poem, after which go through the remaining stanzas speaking of the parts which are the most difficult of comprehension,

After the poem has been discussed it is to be taught to the children. This may be done in several ways. With the 1-A pupils the poem should be learned by imitating the teacher as she recites it. In the 1-B class, and with older children, the poem may be written on the board, read by the pupils, and copied by them.

The New York Training School has an excellent method which is used. The pupils are provided with small note-books. In these books, the poems are to be copied, together with a sketch of the author's life, and whatever illustrations pertaining to the subject that the children desire to keep.

Another excellent way is to place mimeographed copies of poems in the hands of the children. These they can paste in a book and use for future reference.

When we consider how valuable beautiful scraps of literature which were learned in our youth are to us, how comforting, how inspiring, how restful they seem; when we think of the sublime thoughts which they arouse, how they take us away from ourselves, away from the cares and troubles of a very prosaic life, how they uplift us and turn our minds on things above, not on things below; then we would say that it would indeed be a lasting wrong and injustice should we not teach these beautiful poems to the child, and as another has said, "should we so rob him of his birthright?"

Voices, New and Old, Concerning Children's Literature.

By Edith Ewing Schwartz, Instructor, New York City.

THE Bible, Pilgrim's Progress, Robinson Crusoe and Plutarch's Lives were, Abraham Lincoln said, the books he preferred in his childhood; and he "poured over the Revised Statutes of Indiana," which his biographer thinks "most boys of to-day would run miles to get away from." Napoleon Buonaparte's favorite boyhood authors were Plutarch and Tacitus—a significant choice. George Eliot, however, had larger opportunities. She read, so writes Cross in his biography of her, "everything she could lay hands upon—Æsop's Fables, Scott, and Elia, Daniel Defoe's History of the Devil, Pilgrim's Progress, of course, and Rasselas; and "she remembered feasting with singular pleasure upon an extract in some stray almanac from the essay in commemoration of Captain Jackson and his slender ration of single Gloucester. "This," says Cross, "is an extreme example of the general rule that a wise child's taste in literature is sounder than adults generally venture to believe." Sir Walter Scott, before the age of eight years, had "listened to tales of heroes and stories from Shakespeare, told him by his grandmother, but he explored for himself in his boyhood a prodigious amount of classics, a heroic diet which would appal many an average college student."

Melville B. Anderson tells of his father's scanty boyhood library, in which there was a "Brobdinagian volume, Milton's New Complete and Universal System of Geography, with a history of the world thrown in for full measure—a book suited to a giant breed and antediluvian leisure;" and Mr. Anderson supplements this list with the following comment: "I venture to think that the reading of this benighted boy, one-sided and narrow as it was, was both better for him and more enjoyable to him than the 'juvenile' literature of the present age is to our children. Accordingly I have adopted, in the case of my own children, a somewhat heroic line of treatment which has so far worked very well, but which is likely too severe. I have two children of a reading age, the eldest being ten years old. With the exception of some old, unbound files of the *Youth's Companion* and *Harper's Young People*, which have been useful chiefly as picture books, all juvenile periodical literature is excluded. The books which I am inclined to think have so far been the staple of their education are the Bible, the Arabian Nights, fairy tales of Hans Anderson, Hawthorne's Wonder Book and Grandfather's Chair, Pilgrim's Progress, portions of Les Misérables and the first part of David Copperfield. The last part is perhaps for children a little mawkish in places. They are very fond of Robinson Crusoe, Lamb's Tales from Shakespeare and Palgrave's Treasury of English Song. At present I am reading them Ormsby's marvelous translation of Don Quixote, and I believe they like even the passages I find dull. I fear that if they read a monthly number of *St. Nicholas* they would not come to books like these with an appetite so eager and unworn. I am aware, however, that the course of reading I have indicated appeals too exclusively to the imagination to be regarded as exemplary; and I wish some one would afford me the guidance I need in selecting a suitable introduction into the fairy land of science. To the other fairy land, that of history, the path is plain."

That we have in this day to confront a new order of things is certain. It is certain that we must, in the words of a successful school principal: "Look after the reading of our children far more carefully than our parents had to look after ours, for the majority of these books written expressly for childhood are worthless, and a not inconsiderable portion of them of such a character that a child might better be given poison to play with than have them put in his hands. This danger was non-existent half a century ago."

How emphatically the "danger" has presented itself is remembered by many a man who was a boy when the country was flooded with lurid tales of plains-life. At the right psychological moment of their reading not a few boys discovered that they were grievously treated at home, and that their true vocation was that of the cowboy, their hero of literature. Girls have in like manner evidenced the power of harmful reading. A teacher saw a very young schoolgirl eating chalk one day, because somewhere in her library browsings she had read of a heroine to whom like diet had given an interesting paleness. The child has no judgment, no experience to act as an inhibiting force, a restraint to feeling. It is because those who are revolutionizing children's reading realize this to the full, that they plead for nothing but the best in home and school literature.

George William Curtis once answered the question: "How far should children's reading be directed?" as follows: "Children need wise guidance in reading, and therefore parents should have on their shelves only the books for children which are really interesting and refined. In reading, children browse upon what is nearest, and it should be fit for their browsing."

Many are the theories as to what type is the best. One view is that the "best food for the young mind is simple fact. A beautiful natural world, blessed by human lives which have been infinitely more beautiful, yield facts glorious enough to brighten the dullest mind; and it is through these and not through the inventions of man's fancy that we develop that strong sense of truth, that vigorous love of the right, that joyous power to meet the realities of life n all its phases which we acknowledge must characterize the ideal man, yet which the real creature so seldom possesses. We all know how rare, even in highly cultivated adults, is the ability to see truly, o report correctly, and to reason justly. Among a thousand people who will entertain you with the play of their fancy, you will scarcely ind ten on whose serious word you can rely. Careful and painful self-discipline can correct this, but why not spare unnecessary pain and evil by having little children come to the truth at once." The eacher here quoted added feelingly: "If I could have my way I would never let a little child see or hear a word of fiction. The boys and girls, the men and women of whom I read should all be or have been in the flesh."

Of those otherwise minded, Clara Doty Bates, author of "Classics in Babyland," is one. She writes: "Give children poetry and fanciful stories in abundant supply. The imagination should be cultivated, especially in girls. With genial environment, this faculty glorifies character, the home, the social relations, and indeed all of life. If restricted in its sphere, and confined to a humble line of life, it is still able to suggest ways and means for brightening the otherwise barren and work day lot. In no degree has the utmost practicality and literalness of duty, though ever so commonplace, been interfered with by this cherished gift. On the contrary, my observation has shown me that the sourest and most selfish people are those who are either lacking in this mental quality."

But recognizing that fancy need not be falsehood, nor science barren, uninspired fact, Colonel Parker well said: "The liveliest conscious activity of a child is fancy; the little creator creates his own world and lives and moves and has his being in it. Without pictures, images created by fancy, a child's existence would be a desert waste. All history proves this. Professor Hall has said that a precept may be a lie to a child, while a tale of fiction may be the essential truth the growing soul needs. But the truth which fancy brings does not wholly satisfy. Every child is a born naturalist. I would place with fancy elementary science, observation, followed by reading. Follow science, the plants, animals, how they live and grow, with the lives and growth of good men and women; that is, history; fancy, science, biographry, history, to develop the divine tendency of truth-seeking. 'Blessed are they which do hunger and thirst after righteousness, for they shall be filled.' Everything depends upon the teacher's being filled with that subject. The light that shines from the teacher's eyes leads the children upward and onward."

Whether books of fact or of fancy were chosen by the parent or teacher, Burt's Literary Landmarks shows the readiness and delight with which children have received the world-stories of great artistic "build."

Mr. George W. Cable writes in a delightful letter: "I shall never forget the chagrin with which I dropped and abandoned a book called 'Paul Jones, the Son of the Sea,' on finding it was not history. Robinson Crusoe—ah! that is another matter—and the ever-sweet Pilgrim's Progress! How that book built me! I never chose fiction for fiction's sake. By the time I was nine and a half years old my mind lightly turned to books of history. I memorized much of the Declaration of Independence and by the time I was ten and a half I had read four volumes of Hume and the best part of Scott."

Mr. John Burroughs, the naturalist, in a letter as genuine as himself, recommends Hans Anderson for children: "It will make every child's heart beat with delight. It is wholesome, sweet and good. Grimm's Fairy Tales fall far below it in my estimation. They make by far too much of the ugly superstition of witchcraft; and Alice in Wonderland is not to be mentioned the same day with it. A book that my boy (aged eight) and I had such pleasure in that we never cease speaking of it or referring to it in some way, is Pyle's Robin Hood. It is about the best book I know of for any boy, old or young. The illustrations are capital and in the true spirit of the text. I have not hesitated to read to my boy much older books. Any book with a spice of adventure and the touch of reality is sure to arrest the attention of children. I found Mr. Fornaday's 'Two Years in the Jungle' very satisfactory. It is a bright, frank, honest book, out of which a child will learn a great deal of geography and natural history before he is aware of it. My boy listened for hours to passages from Greek and Roman history; such a chapter as the invasion of Greece by the Persians will fire the breast of any child, and he will never forget it. A child's mental diet should be regulated on the same principle that his physical diet is. Let it be simple and wholesome. Everything of the nature of spice, condiment and artificial stimulants should be avoided. Bread, milk, fruit—these are the types. Let him learn to find delight in the real, the natural, the universal."

Mr. Burroughs' allusion to the Grimm Fairy Tales suggests the conviction of some that the fairy story presents the too-frequent picture of wealth unearned, and of spite, to be other than detrimental to a child. Indeed, there has been noticed of late, in children over eight or nine, a desertion of Grimm for Kipling and of the Arabian Nights for Henty. But however much other fads may take the boy or girl afield for a time, it is likely that the good fairy tale will never really cease to hold its own among children if they are allowed to take it as simply and naturally as they do hot milk before they discover that their elders drink coffee!

A teacher told me that some months ago she was one day readng the Arabian Nights' story of the Enchanted Horse with some ittle boys of ten years. They were as eager and interested over it s the Sultan of the Arabian Nights himself was over tales, and egged her to continue the reading until the whole story should be nished. She turned to a guest, who just then entered the room, nd said: "We've gone back to the days of our youth." From that nstant interest waned and the little readers "didn't know they cared or that story anyway." All of which goes to show what subtle uggestion will do. In this case none was intended by the teacher; ut the children, she said, were quick to feel the magic circle of omradeship broken, and the charm of the Enchanted Horse was one.

Beside the folk-lore and fairy tales, so-called, there is much to ecommend the Hero Stories of the Ancients, for, as one writer well nsists, 'in none of these stories is the motif complicated." They o not analyze things into abnormalities. The Greek, Roman and Norse stories, in particular, have proved to hold a very permanent place in the regard of children. Not, however, in their entirety, as a ule. Dr. Welsh, in a recent address, said: "Classics need not be dapted to children. Children are adapted to the classics." Every eacher goes through the period when he believes this to be true. He therefore takes such a charming translation perhaps as the one of he Iliad by Bryant for use in the schoolroom. But the length of it makes any other book impossible in the school year. The teacher soon finds that it cannot be read, without expurgation, to children, for such narrative needs in the mind of the reader a background of history of the times when standards of morality were very different from those the twentieth century recognizes. Moreover, the teacher observes that children themselves are quick to characterize as "pure talk" the portions not essential to the development of the story. With these facts in mind, many careful writers have put forth editions of the classics, the best of which escape the tone of literature "written down" to the comprehension of the young, and are, says William Morton Payne, "certainly as well written and intrinsically interesting as any products of the modern imagination."

Burt's "Odysseus" and "Herakles," Hanson's "Wanderings of Æneas" and White's "Tales from Herodotus" are all good. Among younger classics, Johnson's "Don Quixote" and Frost's edition of "The Knights of the Round Table" are liked by children, though the latter book is at times facetious in style and a little inclined toward aggressive Americanism. It is, however, the best edition of Round Table tales which has yet appeared. None of these books fail to appeal magnetically to the young. Of course the "Wonder Book," that classic in the dual sense is as great a treasure house to every child as it was to Mr. Julian Hawthorne, who has spoken very charmingly of what his father's book was to him.

Mr. Hawthorne does not care for the modern child's realistic stories that are crowding our juvenile periodicals. "What might happen, not what does happen, is the thing for children," he urges. Mr. Edgar Fawcett, an admirer also of imaginative literature, thinks that "Nürnberg Stone," in Madame de la Ramées' "Bimbs," the most perfect child's story ever written.

Mr. George P. Upton, author and musical critic, believes that children should be educated in the literature and history of music. "The painter's famous advice to his pupil to mix his colours with brains is equally applicable to music," writes Mr. Upton,—"and it is a fact that the most inspired musicians have been the most thoroughly grounded in the knowledge and literature of their art." An interesting list of Mr. Upton's favorite books for young people gives a high place to "Ella's Musical Sketches," Busby's "Music and Musicians," "Joseph Haydn, the Story of His Life," by Toohey, and "The Tone Masters," issued under the auspices of Dr. Tourjée. Another critic would include in the list Mr. Upton's own descriptions of the operas, oratorios and cantatas.

An architect of more than local authority puts in his claim likewise for a little reading by children upon his art, and insists that if every girl would but read the "House that Jill Built" domestic architecture would soon show a vast improvement.

One very successful teacher of literature deplores the fact that magazine and other fiction with girls, and over-exciting adventure such as Henty offers boys, have almost destroyed the taste in children for books of a meditative or quiet character. Rapid sequence of event, excitement in reading as in all else is the voiced or unvoiced cry from Babyland to maturity. Every decade of our living marks a change in degree. One young woman remembers reading in school when a child, "Titbottom's Spectacles" in the "Prue and I" of Curtis. Every pupil was equally captivated by the exquisite diction and by the story, so serene in measure throughout, yet not lacking in spirit. Last month some other twelve-year-old pupils of fully as good an intelligence were reading the same book with the same teacher, but it needed not more than ten pages to weary the souls of the little people, and they clamored for something of livelier rhythm. Of flute pastorals they would have none.

As an offset to this indifference to books tranquil, boys and girls alike are manifesting a natural and healthy literary taste in their great liking for Seton-Thompson's "Biography of a Grizzly (Bear)" and his "Wild Animals I Have Known." The children are kept aglow with an enthusiasm which never drags, over the latter book especially. They are led through the reading of it to tell of their own knowledge of the habits of wild animals; they refer offhand to incidents in the book with frequency and understanding. It was only lately at an exhibit of wild animals from Maine that a sturdy boy pointed to one of the wolves of a sudden and exclaimed to the bystanders: "Lobo looked just like that one!" His audience understood.

One teacher expresses the wish that "Wild Animals I Have Known" might be put in the hands of every child in the land. From an educational standpoint, Seton-Thompson is well qualified or his task, for he is a close and patient observer, and a lover of all iving things of the woods. He writes simply, and his style is appy, though it has not perhaps the splendid vigor and purity of Mr. Burroughs' writing.

Burroughs' latest book, "Squirrels and other Furbearers," has ad and is having great popularity with older boys and girls, and en thousand copies of his "Little Nature Studies," a book for very oung children, has been sent by the U. S. government to the Philippines for use in the schools there. Mrs. Sidney Lanier, wife f the poet, in recalling the mental fare of her own sons, has spoken f the delight with which the youngest, when only seven "pored ver Burroughs' 'Birds and Bees' and his 'Wake Robin' without uggestion from anybody; but then—" she added, "I should not ave thought of offering John Burroughs' essays to a child of seven, or his unaided reading. That one may do so, speaks volumes for he clarity and vitality of Mr. Burroughs' books."

Of late I have heard piping up, the enthusiastic little voices of class of ten-year-old folks who have been chuckling over Uncle Remus, the ever entrancing. Another class averaging twelve years as had keen relish for the delicate humor in the "Howell's Story Book." The stories in it of "Christmas that came every day in the ear," "The Pony Engine" and "Boy's Town" are spontaneous nd charming.

A new book, "Wilderness Ways," by Long, is fresh from the ress. It, like Seton-Thompson's work, is a chronicle of the life of wood-animals, and as such, has had the unflagging interest of a lass of wide-awake boys. Some awkward and incorrect turns of peech mar the artistic value of the book. The subject-matter, owever, is well chosen, and the observations of the writer is said y those skilled in woodcraft to be accurate. The stories on the whole are very pleasantly told.

Sarah Cooper's "Animal Life in the Sea and on the Land" has ot yet been superseded by any better literature, purely scientific, or class-room use in the fifth, sixth and seventh grades. The lustrations are still copied extensively.

Book lovers recommend, with the "five literary bibles," many perfect modern stories which are not mentioned in this paper, but which are already widely used, such as Warner's "Hunting of the Deer," and Kingsley's "Water Babies;" the feeling, too, is widespread that a return to the "learning by heart" of fine poetry should be encouraged. Such poems as the "Clamperdoun" of Kipling, "Wynkyn, Blynkyn and Nod," by Field, and "The Finding of the Lyre," by Lowell, are recognized as excellent for memorizing.

The book, any book, that "touches the heart of the subject, that opens the eyes and mind of the pupil, enriches his imagination, or liberates his personality," is a book needed for children's reading.

Spelling in the First Three Years.

By MARTHA ADLER, Instructor, New York City.

THE aim of spelling in the first three years should be to give to the child a working written vocabulary; and, as the work in reading in these years should give to him a key to the printed or written page, in like manner, should the spelling give a little facility in the making of that page for himself.

There is but one spelling-book which may be used advantageously in the first three years of school life, and that is the spelling-book made by the teacher, the list of words growing out of her needs and the child's needs; or perhaps we should simply say "that the only spelling-book which has true meaning for the child is that which meets *his* needs."

The language lesson, the science work, the morning's conversation furnish a very comprehensive list of words. In the selection from these we are met by a difficulty in the fact that the words introduced in these lessons are frequently uncommon and rather technical, at least more so than the words in the vocabulary ordinarily used by the child; so that, in taking these, the words he really should have, may be crowded out. Our caution must be, then, to take from the lessons of the day *such words as are of most frequent use.* The drill should be on *his own vocabulary.*

It would be quite safe to follow the suggestion of Supt. Gregory, of Trenton, "that we may leave the new and uncommon words to be learned later, and teach only the familiar words," at least for the first three years.

Mistakes in spelling are certainly much more frequent in familiar words than in the uncommon ones, and the reason thereof is certainly quite apparent in the fact that the familiar word has been spoken often before the child sees the written form, and quite as frequently mispronounced.

The uncommon word and its written form are *new* together to the child; the word "calyx" and its written form "c-a-l-y-x" grow up simultaneously in the child's mind as oral and visual percepts, and no incorrect form ever obtrudes itself. On the other hand, "hafter" has no connection with "have to" in sound, hence none in spelling; "wud'uv" in no way suggests "would have," and so on. It would therefore seem advisable that in the selection of words for these early years familiar words should have *first choice*, and *prime importance*. Having considered the matter of the selection of our list, our next point is the gradation of the selected words.

Upper grade work in spelling certainly affords splendid opportunities for the cultivation of the powers of comparison and discrimination. The spelling lists consisting of words similar in sound but differing in spelling, those similar in spelling yet differing in sound—in fact, have lists introducing the many idiosyncrasies of English orthography, any place in the work of the first three years? I should say, No. The early work should not present the difficulties, but should rather approach them in the most natural way, and seek to obviate them. In the line of this thought the work in the very beginning should consist of *phonetically spelled words*, all *phonograms should be made use of*, and the phonic and spelling work should be made mutually consistent.

In view of the fact that spelling grows out of language work and reading, we may ask whether spelling can be learned from reading? Unquestionably, *no*. Very few can learn spelling in this way. Spelling as a formal subject of instruction should not be underrated. When properly taught it affords an eye and ear training of inestimable value.

The work of the first year omits spelling as a formal subject, yet in the "copying of easy words and sentences" an informal introduction to spelling may be made, since the primary function of transcription undoubtedly is *spelling*, and if the children write *with* the teacher rather than *after* she has finished, they will quite naturally form the visual image of the words they are writing.

In the second year *formal* spelling is begun, and when we consider that our end in spelling is to train both ear and eye, and that the ear-mindedness and eye-mindedness of individuals vary in a very large degree, we must agree to provide for these differences in the methods employed. Oral work must precede written work; the two must be taken alternately and together. Spelling is distinctly a *memory exercise*, hence we must have repetition, concentration and interest. Exercises should be frequent, rather than prolonged. Spelling by syllables facilitates the work greatly, and the old-fashioned method of pronouncing the syllables in the cumulative way (employing, e-m em, p-l-o-y ploy, employ; i-n-g ing, employing) is undoubtedly valuable in emphasizing syllabication, giving familiarity with new words in reading and in its logical analysis of words. The devices which may be used in teaching spelling are too numerous to be mentioned in a paper of this scope. The important point to be made in regard to the method in spelling is—

have it varied, that it may not become mechanical, and that parrot-like formalism may be avoided. The formal work may be intense while it lasts, but it is not the *end*.

The word-drill and the column-drill should be preparatory to the paragraph—and right here let it be said that the place of the word is *in the sentence*. Written spelling should be dictated *in sentences*. Of five lessons of written spelling, at least *three* should be in sentences, and even when single words are dictated they should be written *horizontally*, since the word in the column affords no opportunity for syllabication.

One half the mistakes in spelling in composition are prevented when spelling is habitually taken in sentences. It is a good plan occassionally to dictate a paragraph from a composition as a spelling lesson. The "Once upon a time there were etc.," paragraph produces very benefical results when once learned in a spelling lesson!

A final word as to correction—the time-saving problem must be considered, of course, yet it has proved very benefical to follow the self-correction plan in the following way: after the spelling lesson has been dictated, each child has before him his own work. When two children sit together both papers are on the desk, so that both children may look on the two papers.

The exercise is then spelled, word by word. Children who find an error in a word stand, and the correct form having been placed on the board, they correct their own mistakes by drawing a line through the mispelled word, and writing the correct form above. If time allows, the child also writes the word in his "misspelled book,"—a book in which he keeps all his misspelled words, and if it is not done at this time, it is done at some other time during the day.

But the correction of the misspelled word should be immediate, and "whenever and wherever a mistake occurs in spelling, *there* t should be corrected."

Spelling means a mastery form, and the correct form should always be the final image left with the child.

If our criticism of mistakes in spelling be really analytic, we may discover much as to the cause of failure in many children. Fewer dictation lessons with more analytical correction would certainly lead to better results, and when the real difficulties are anticipated in teaching, rather than combatted as errors, we may hope for a more natural and intelligent comprehension of the work n spelling, in the first three years.

Reproduction of Tales, Stories and Fables.

By Catalina Páez, Instructor, New York City.

Childhood's realm is a world of fancy, whereof the story-teller is king, by acclamation.

WHAT poetry, music and painting are to adults, to the young child is the story. It supplies the spiritual element of his life. And since the culture and fostering of the things of the spirit is the highest aim of all education, who can estimate the value of the story in the primary school? It is the key to the child's soul, that wonderful, intangible thing of airy delicacy, and awesome sublimity, fraught with the heritage of all past, and the hopes of all future. The time is now happily gone, when school was a place for the performance of a number of set tasks, and the absorption of a tabulated series of facts. The teacher's mission is not so much to instruct as to guide and stimulate, to establish a strong moral tone, and to create a love for the "beauty" that "is truth." Precept and example may assist, but cannot fully accomplish this purpose, for the reason that they are, to a large extent, eternal and consequently artificial stimuli. Lasting good can only come out of forces operative from within; the child must have an ideal, a concrete image, or series of images, representative of the abstract qualities, upon which even the average adult mind finds it difficult to philosophise. Stories and fables, well selected, present these truths, in the only form in which they can be appreciated and accepted by youth—an attractive one. Tell a boy that cruelty to animals is ethically wrong; he will agree with you, and continue to rob birds' nests and beat the dog. Tell him the story of "Black Beauty," and you will find him haranguing coachmen on the evils of the check-rein and, while walking up hills, to ease the load.

The story must not preach. Let it show the goodness of good and the ugliness of evil without talking about it. No stories appeal more to children of all ages than the great old fairy tales, where the good princess always marries the virtuous prince and settles down to eternal bliss, while the wicked relations go to a well-earned doom. Folk-lore and fable, sprang out of the childhood of the race and are the child's rightful heritage. In every tongue they sway the hearts of the young, the fanciful and the simple, by their eternal youth, their simplicity and their daring flights of fancy. Let it be extravagant and fanciful if it will, impossible even (children and poets have a lofty disdain for facts), but, as Carlyle says, "What are outward details if the inner secret of it be true." The story accomplishes its purpose if it stores somewhere within its gleaming shell a great life truth, an ethical lesson, a universal experience, or merely a beautiful thought that will plant its pure seed in the heart, to blossom in some dark hour of need in a bloom of fragrant fairness.

From the fairy-tale we turn to mythology, Greek, Roman and Norse. If folk-lore represents the childhood of earth the myth may well typify its youth. Simple, like the fairy tale, it shows a strenuousness, an activity, in which the other was lacking. There is also, especially in the Greek stories, that all-pervading passion for beauty and vivifying of nature that is so typical of the Hellen. This last finds a responsive echo in childhood's heart. The little girl puts a soul into her doll and sees a fairy in a lily's chalice; the boy turns a gnarled apple-branch into a prançing steed and a field of corn into a charging army. The Greek placed a Dryad in every oak, a Naiad in every fountain. The sun had his steeds and the moon maiden her quiver and hounds. These lessons contain many lessons of deep ethical value; friendship is exalted, greed is reproved, and always the heroic is noted and extolled. Children are hero-worshipers, and they instinctively seize on and admire physical prowess, bravery and fearlessness. In the Norse legends the gods and heroes of Asgard possess the same simplicity of character as the subjects of the southern tales. They are rougher, ruder, with the snap of northern frost and the ruggedness of the northern winter. Still, what poetry, what depth of mother-love in the story of Baldin! We always have that for a Christmas lesson when we hang up the holly and mistletoe, in memory of Baldur's blood and Frigga's tears.

Then we learn a few of Matthew Arnold's exquisite lines on our hero; for the study of the myth leads naturally into the realm of English literature, whose masters loved to dwell on the Old-World legends of classic lore. And here the teacher's culture and taste must manifest itself, and she is given the sacred privilege of unlocking for these little ones the vast treasure-house of song and story. Like all dreamers, the child is a poet, and poetry he will love if wisely and prudently guided to it.

From folk-lore, myth, and literature, the outgrowth of a nation's soul-life, there is but a step to the story of its outer life-history. No subject in our curriculum deserves more careful handling than this, which is so frequently and cruelly mismanaged. Too often does the history lesson degenerate into a chronological table of dates and facts, a list of battles, and the names of a selected galaxy of celebrities who exist in the minds of the pupils only as a name. If "universal history is the story of great men," these men must be made to live, and it is in this vivifying process of story telling that the teacher's greatest art lies. How can a child reproduce unless he has a thought to tell, and who is to give him thought but the teacher? On the proper presentation depends everything: the pupil's understanding, interpretation and reproduction in good, simple English. First, the teacher must be full of the subject; a master of all the details which make so much for vividness; she must have deep insight into the child's mind and keen sympathy with his emotions; she must be alert and discriminating, "not all points, but salient points," must be her motto. Finally, she must be able to talk: good, homely, Anglo-Saxon, colloquial without slanginess, pure without pedantry, is the language that little ones understand. Her story must be coherent; the parts should hang well together; it must be a unit; make your point and stop.

Good telling is the best recipe for retelling. The child's instinct for imitation will lead him to restate not only the facts, but to copy the spirit, manner, and often the words of the original version. It is a good plan to let the brighter children speak first. We all know the pedagogical value of repetition, and children love to hear a tale over and over. Still the backward and shy must be encouraged; draw them out, but help as little as possible. Skilful questioning will often unravel a tangled thread of the narrative. Offenses against grammar must never be allowed to pass uncorrected, but let the child do the talking. Unfortunately, our children can be given too little opportunity to speak (perhaps if they could they might learn to do it better). This story lesson must be their opportunity for self-expression. After the talking comes the writing. In the lower grades this must necessarily confine itself to a few sentences. After the third year we may develop the narrative form of composition, when topics become a valuable aid to clearness and coherency. If we succeed in getting a clear *thought*, let us rejoice and say, with Kate Douglas Wiggin:

"*When our feet grow weary and our faith grows dim, help us to follow close after the ever-perfect One, who taught even as we are trying to teach. He it was who spake in parables and stories.*"

The Use of the Dictation Exercise.

By Bernard J. Devlin, Instructor, New York City.

THE dictation exercise is the most formal of studies: its aim and end is the proper expression of written language considered as governed by rules of custom. Such content, as the exercise has, applies solely to these rules and must be dealt with under the divisions of composition—spelling, capitalization, punctuation and paragraph. Dictation, therefore, occupies a secondary place in any curriculum, but withal a necessary one. It is necessary for two reasons which are interrelated: it has a place at some time in the life of every fairly well-educated individual; it familiarizes with the proper form in the divisions of composition mentioned. There are other reasons for its use, but these are fundamental. It may also be said to be a means to an appreciation of good English. In this respect it supplements reading, and as the motor activities involved lead to a closer familiarity, may be said to transcend it. This appreciation is a requisite for the production of good English, but is most actively taught in the divisions of the composition exercise proper—reproduction, narration, description, etc. We are concerned only with the fundamental aims of the dictation exercise. If the child can properly spell, punctuate, and paragraph, under the conditions that obtain in dictation, there is good ground for hope that his own productions will exhibit like proprieties. The question is, how may these preliminaries be most effectively taught?

We are still groping for an effective method of teaching spelling; we cannot fall back on a list of words or "spelling-paper" as a test of knowledge. It is a fact that words, properly spelled when thus tested, will be misspelled in composition or dictation. Spelling and capitalization can be properly tested in the expression of ideas that are in sequence, for seldom under any other conditions in actual life does the need for such test arise. In punctuation, the principle, "Proceed from the known to the unknown," would almost warrant us in assuming that dictation should *always* precede when a new punctuation is the subject of instruction. Without going this length, we may consider it a safe guide. The thoughts in a well-chosen selection bear a relation, one to another, which only writers of clear English have power to denote by punctuation marks; and here, if ever, will be had the best examples of the various relations to be pointed off. Paragraph structure may also find its exemplification in dictation before it is employed in original composition.

Proper instruction through dictation needs more and longer study on the teacher's part than appears at first sight. An aim is indispensable. This secured, a selection must be found that clearly embodies it. The selection must be of proper length, seldom more than eight or nine lines even in the highest grades, must be an example of the best English writing—preferably from a classic, must be within scope of the intelligence of the class, and must bear some relation to its other knowledge or experience. Then follows the question of method.

When the aim of the lesson has been explained—if the nature of the instruction has so permitted—the class should be allowed to read the selection from books or from the board. On a subsequent day the selection is dictated. Each individual then corrects his own work by reference to the book, or to a copy, previously placed out of sight on the board. If there are no corrections the lesson has been too easy; if many, then it has been too difficult. Only the teacher's judgment may decide. It is the opinion of the best authorities that the dictation exercise should always be a test of what has been previously known; hence there is little defence for the use of selections embodying unknown words and unfamiliar elements of composition. Still, this does not preclude the occasional employment of a selection, within the comprehension of the class and not previously seen, for the purpose of sustaining interest in the exercise.

The dictation of short phrases, parts of phrases and of single words, should be avoided. Only phrase wholes and clauses can afford that training in co-ordination of ear, hand and eye, which results in a valuable power of expressing thought in writing. More mistakes may appear and the penmanship may suffer, but the child will be obliged to cope with thought in a natural way, and in a natural way will struggle with and be led to overcome the difficulties of its transcription. If retention of the thought is difficult at first, resource may be had to repetition of the passages by members of the class; the teacher seldom or never repeats. Whatever the value of recopying in original composition, it is almost absolutely useless in dictation.

As good Americans desirous of restricting the undue influence of authority, we sometimes fall into the error of lauding unduly that which is representative of opposing conditions. Everything formal is attacked in turn, and the dictation exercise has not been spared. Let us, however, take heed lest in our pursuit of content the idea of form altogether disappear. Formal training is necessary for the child in his endeavors to co-ordinate thought and language and due consideration must be given to that study which emphasizes the formal side of language—the dictation exercise.

Composition in the Fifth Year.

By Anna A. Short, Instructor, Manhattan.

FROM the models found in the class reading, the pupil can be taught the essentials of composition. In every formal reading lesson the teacher has abundant and excellent material in which to develop the idea of a sentence and the complete thought it expresses. Then she may direct attention to the building of the paragraph and the unity thereof.

By a careful reading of the lesson, the essentials may be distinguished from the non-essentials. This leads to the principle of subdivision of the lesson into topics, and the fact that each topic is developed into paragraph form. The pupil can now see the logical or chronological order of the topics in the lesson. All this is but another instance of that correlation of subjects which is of real and permanent benefit in the instruction of the child.

Composition, as a school subject, is admittedly one of the most valuable in the Elementary Course. Its close relation to the reading lesson, in fact, its dependence to a great extent on the reading, is without question.

Before the pupil is set to write, the teacher should explain clearly what is to be done and how it may be accomplished. The pupil should be led to imitate intuitively the forms he is accustomed to see and hear. His every-day experiences have a great influence upon his writing, more so than any drumming of rules and theoretical explanations which in fact are often meaningless to him.

Hence we see the importance of familiarizing him with good models and of assuring him that the language employed in the reading is a model of its kind. The ideal aim would be to cultivate in the pupil the habit of careful examination of the reading lesson for models of composition.

The work in composition is outlined by the Course of Study. Narrative and descriptive compositions and letters of application and inquiry are required in the first half of the fifth year. In the second half, narrative and descriptive compositions are continued, and "the elaboration of short stories by the teacher" is added. In relation to the science work of the grade, fables about animals may be used. The selection of stories is to be carefully made. The letters of this grade are business notes and those expressive of the pupils' individual experiences. One hour a week is the minimum time given to composition in the fifth year. This may be divided into two periods of a half-hour each.

The subjects of the grade ought to furnish most of the material for the composition exercises.

Naturally the compositions based on history are usually the best. In the fifth year at school, the children have just arrived at the age when they love to listen to stories of daring and adventure. If the stories are well told and the salient points dwelt upon, little difficulty ought to be experienced in obtaining good reproductions. Interesting stories from the reader are also good subjects for narrative compositions.

Descriptive compositions may be based on the geography and science of the grade. They are more difficult than the narrative compositions because they admit of little variety. Description demands more judgment, and help is needed in the way of suggestion and treatment. Any interesting material with which the children are acquainted may be made use of. The objects to be described should be those which are known to the pupils. The importance of seizing upon the salient features first, as well as of taking the points in the natural order, should be made clear by the teacher. A good exercise in description is to place a picture in front of the class, or select one from the reading books, and let them tell what the picture shows. Here some play ought to be allowed for the pupils' imagination.

Individual experiences give us an insight into the lives of the children. These compositions have to be carefully guided, because the imagination is apt to run riot, and a confused composition is the result.

Letters should be based on good models which may be found in language text books or in business and social form books. Or, the teacher may prepare a good model for the class. In letter writing the following points ought to be considered: Heading, address, salutation, signature, and the body of the letter. Children should be taught how to fold letters and also how to address envelopes.

The composition work may be divided into two parts, formal and informal. Informal compositions may be written several times a week. They are merely reproductions of the lessons in history, geography, science, reading, or, occasionally, of some picture study. No distinct division into topics is required, and the time may easily be taken from the lesson itself. The purpose of these informal compositions is to strengthen in the children's minds the impressions made by the lessons. Or, as Superintendent Jasper in his report to the School Board says, it gives the children "opportunities for free practical work, in which they put down in their own words and in their own way what they know and what they think about their various subjects of study."

Practice in this work leads the children to grasp the principal points of the lesson and to note the sequence of events. Ease and facility in writing are acquired. No written corrections are required from either teacher or children. At the beginning of the next lesson, the teacher may read a few of the good compositions as models, and also as a means of review and preparation for the lesson.

As a model for the narrative composition, a simple story, historical or biographical, may be selected from the reading lessons or supplementary reader. The text books in geography and science furnish models for descriptive compositions; or, the model may be prepared by the teacher. If possible, the points in description ought to be tested by examination of the object itself.

The method of preparation for composition lessons includes the following:

1. The telling of the story by the teacher. This should be done in a simple, logical manner, so as to bring out into relief the more important points and to show their relation to one another. These points may be further impressed by questioning the class.

2. Oral reproduction by the children. This may be done either at the close of the lesson or at the end of the different steps of the lesson.

3. The topics may then be placed on the board. It is a good plan to have the children suggest some of the topics. Unity and sequence of thought are best discerned from an outline of topics.

4. Oral composition by a few of the brightest children, following the outline of topics. In oral composition watch carefully sentence and paragraph formations.

5. The writing of the rough draft. The paragraphs should be formed of sentences that are not too long or involved. The teacher should encourage the children to express their statements in an easy, natural way, and to make them the outcome of having something to say. The words should be the simplest to serve the purpose, and they should be such as the pupil is familiar with.

In many lessons in composition, the children are given a certain time in which to write each topic. They are not allowed to proceed from one to the other until a given signal. This plan forces them to concentrate their thoughts upon each topic and it prevents hurried and careless work. As far as possible silence should be insisted upon except for the asking and answering of necessary questions.

The time given to the second lesson of the week may be employed in the correction of the compositions The efficiency of the compositions depends entirely upon the care with which the errors and defects are pointed out and discerned. It is good to have a definite purpose here. Do not try to correct all faults in one lesson. At one time attention may be directed to spelling; at another, the use of capitals and punctuation; at another, errors in expression. Other matters, such as the statement of the title, division into paragraphs, neatness of arrangement, good writing and margins for corrections should not be disregarded.

At the beginning of the lesson the papers are distributed, each child having his own paper. The teacher calls up one of the class and he stands near while she reads his composition. The composition should be read just as it is written and the corrections suggested either by the child himself or by the class. The children then look for mistakes in their own compositions and correct them. Two or three children follow the first and have their compositions corrected in the same way. For variety, one or two children may read their compositions to the class. This work will take about fifteen or twenty minutes; the remainder of the time may occasionally be spent in rewriting the compositions. In this way habits of neatness may be cultivated and a drill in penmanship afforded.

Another plan is to devote the whole time in reading the compositions. The objection to this plan is, that unless the compositions are highly entertaining, children lose interest and inattention is the result.

Standards are created and ideals developed by class criticism. It leads the children to recognize what is good and attainable and it trains them to listen, to think and to speak in turn.

One set of corrected compositions is required each month by the Course of Study. This set receives the personal attention of the teacher. A code of corrections may be employed as well as interlining wherever necessary. Compositions are then returned to the children and rewritten.

Here let me quote again from Superintendent Jasper's Report: "The method of correction recommended by the superintendent does not, if properly followed, place any undue or unnecessary labor on the teacher. This method is briefly as follows: The teacher, by underlining or by other sign, is to indicate upon one composition a month for each pupil such errors as the pupil should be able from previous instruction to correct for himself; the teacher actually to correct only such errors as the pupil could not be expected to correct for himself. . . . The composition of some pupils, especially of those who hear but little English spoken at home, need and receive special attention. . . . No conscientious teacher will admit that the method of correcting written compositions recommended and generally followed throughout our schools is a waste of time and strength. A pupil who is deprived of personal criticism and correction by the teacher, does not and cannot advance equally with one who receives it. He becomes careless and loses in accuracy of statement."

The following are some things that may be avoided by the teacher in order to lighten her work:

Trying to rewrite compositions, that is, substituting her language for that of the children.

Leading the children to confuse the minor details into the essential features of the work.

Do not read the story. Tell it. Greater interest is awakened by the telling than by reading or by having the children read it.

The compositions ought not to be too long. One page or one-and-a-half pages will ordinarily suffice for the development of themes fitted for fifth year work.

The subjects ought not to be above the children's heads. Want of clearness arises chiefly from the imperfect realization of the thought to be expressed. Matters of an abstract nature should as far as possible be avoided.

In conclusion, it might not be inappropriate to call special attention to the fact that great care and judgment should be exercised in the selection of subjects for composition work. Unless the subjects are within the average range of the children's understanding, the work, despite the most careful preparation, cannot be successful. Well-chosen subjects will awaken their interest and lead to a freer development of their ideas and an easy natural way of expression. Oral composition will give the necessary practice and drill as a preparation for the written copy.

The Use of the Dictionary.

By KATHARINE D. MAHONEY, Instructor, New York City.

THE main function of the dictionary is to give the meaning or meanings of separate words and phrases, in plain, simple and unambiguous language. Helpfulness should be the ideal of the dictionary, and when it follows this ideal, it renders a good service to the language. The meanings of words should be comprehensive and accurate; when found to be so, they tend to simplify and perfect the language. How often does the dictionary fail to fulfil its purpose! A dictionary which defines a word by giving its synonym surely does not simplify that word for the child who has been given the task of "looking up" the definitions of his words. This is frequently the case with the small dictionaries in the hands of our pupils. Few words, if any, are perfect synonyms, or which have not some difference in their meanings or applications. Hence to define by synonyms is confusing. When seeking the definition of a word, and its synonym is found to be the only definition given, the best way of finding the exact meaning and proper use of such word is to seek the definition of the synonym. As far as possible a child should be taught to give as clear a definitive *statement* as possible, and then, when necessary, to bring out the shade of meaning by the addition of apt synonyms.

2. In grades where the dictionary has not been placed in the hands of the pupil, blackboard exercises on the use of the dictionary should be given. Show how to arrange words in strict alphabetical order—re-spell the word phoenetically to show the pronunciation—demand but one definition for a word. Later when the pupil has the dictionary for his personal use, and after he has acquired facility in finding the words, ask for more than one meaning for a word: viz., define the word as a noun and as a verb. Show that the principal word in the definition of a noun *is a noun*, of a verb *is a verb;* of an adjective *is an adjective*, etc.

This would be a part of the instruction only when the pupils were familiar with grammatical phraseology. Invariably when a class exercise is given on seeking the definitions of specified words, the teacher is met with the question, "May I use your dictionary?" "Why?" "Because the large book gives me a choice of definitions, and there is always at least one among them that is clearer to me than those I find in my small book." Here the child has found out for himself the uselessness of defining words by synonyms. Experience with some of our small dictionaries shows that they frequently fail to help. When a "flea" is defined as, "a small insect of remarkable agility," we see that such a definition would be of little use to anyone who did not already know what a flea was. We fall back on a definition only when obliged to do so, and when such a definition is neither comprehensive nor simple, the dictionary fails to be of service to the language.

3. We consult the dictionary to find out one or more of three things about a word:

1. Its correct spelling.
2. Its correct pronunciation.
3. Its common *present* meaning.

In our language instruction, and particularly in composition work, a pupil often consults the teacher about the spelling of words he wishes to use. She tells him to seek the word in his dictionary; but he is not sure about the pronunciation of the word, or the spelling of the first syllable, and so, having no sure guide with which to begin his search, he is liable, unless he is persevering, to guess the spelling. There can be no doubt that phoenetic writing would greatly facilitate the acquisition of the power of reading, and consequently of the education of children and illiterate adults. To learn to spell from perfectly phoenetic characters would be merely to analyze pronunciation.

A child at school might be made a fluent reader in a few weeks—all uncertainty of pronunciation would vanish at the sight of a word, and dictionaries of pronunciation would be superfluous. Such a method of instruction would be misleading, because in phonetic writing the eye would no doubt confound such words as *hear* and *here*, *their* and *there*, *sea* and *see*, etc., when written separately in a vocabulary. We say to the child, "*Write as you speak.*" If he has been accustomed to pronounce his words carelessly, without regard to the syllabification of words, he will write and spell incorrectly. The first requisite, then, in teaching the use of the dictionary is an exact knowledge of elementary sounds, and a study of the key found at the bottom of each page of the dictionary. Lessons in oral spelling, particular emphasis being put on the syllabification of words, should be conducted from time to time. When placing a list of words on the blackboard, the emphasized syllable should be noted by a diacritical mark. A pupil, now knowing the exact sound of the first syllable, is better able to begin his work with the dictionary. A study of affixes must go hand in hand with the spelling lessons.

4. There are some words which should never be sought in the dictionary. With an understanding of the meanings of elements, a child need not seek compounds nor derivatives, for their meanings will be readily formed and understood with perfect certainty without the aid of a dictionary, unless indeed such words have developed meanings which could not be inferred from the meanings of their elements. Such a word as "homeless" may not be found any more than the phrase, "without a home." Usually the most common meaning of a word is given first; that is, preference is given to the order of usage over the historical order, because the historical meaning of a word is often obsolete. *Knave* in early English meant a "boy" or "any male servant," but *knave* has now become a synonym of *villain*. *Villain* has changed its meaning from "a countryman, peasant or farm-servant," to "an extremely wicked person; a rascal." And so one might quote innumerable instances where historical meanings are at variance with the present meaning of a word. The study of such historic changes and reversals of meaning is an exceedingly interesting one, and though it is but seldom that we consult the dictionary to find the meaning of a word in Chaucer's time or even in Shakespeare's or Milton's, yet, such words do come up in our supplementary reading and it is well to consult the dictionary concerning them.

5. When more than one meaning for a word is given, and the child has been told to find the definition for the word as it is used in a certain paragraph, tell him to substitute the definition for the word. He may be obliged to modify the definition in order to have it "fit in," as it were, but if the finished statement conveys the same meaning as it did before, then the correct definition has been found. Quotations should be used to verify or to illustrate the meanings of words, and such quotations may be found in the unabridged dictionaries. Our most recently published dictionaries—to which our pupils have access in the libraries—contain quotations from the more modern standard English and American writers, and we all realize that with the development of our language, it is important to teach our pupils the meaning that living standard writers are giving to words. Without the help of quotations it is almost impossible to define meanings with certainty, for they are next in importance to the definitions themselves. An objection might be made to the use of a dictionary that contains definitions so numerous that they stretch out in a line like that of Banquo's progeny in the witches' cave. But if we can encourage our pupils to use the large dictionary, we have taught him a lesson that will be of service to him when his school days are over. Pictorial illustra-

tions, also found in the dictionary, will be of the greatest assistance in making clearer the conception of the text. We find there wood-cuts illustrating different breeds of animals, the coins and flags of many nations, examples of architecture, coats of arms, etc.

As regards pronunciation, we do not claim that a close study of any *one* dictionary will give us the most correct pronunciation of a word. The pronunciation of the English language, like that of all other living languages, is in a great measure arbitrary. It is exposed to the caprices of fashion and taste, and consequently liable to change. The standard of pronunciation is not the author of any dictionary, but it is the present usage of society, and the only method of knowing the extent of custom seems to be the inspection of those dictionaries which treat of pronunciation.

The Spelling of English.

By JAMES C. FERNALD, Editor of the "Students' Standard Dictionary," the "Classic Speller, etc.

ENGLISH spelling is the nightmare of education. Teachers and scholars alike groan under the infliction. The little girl learns laboriously that s-o-a-p spells *soap*, and then with all innocent confidence spells *rope* r-o-a-p, and it is an error, and no mortal can tell her the reason why. It is for this reason that the accepted spelling is peculiarly beneficial to teachers. For the greatest danger of the teacher is an excess of rule and system. As a defence against this danger the small boy is mercifully provided, in his infinite variety. By every sort of mental contortion he resists and resents the attempt to run him into a uniform mold. To be sure, the struggle is agony to him, but then he has the comfort of knowing that it is also a torment to his educators.

Thus the sound of *i* in *pine* is expressed by seven letters or combinations of letters, *i* as in *smile*, *ai* as in *aisle*, *ei* as in *height*, *ie* as in *lie*, *eye* in the word *eye*, *oi* as in *choir*, and by plain *y* as in *fly*. Lest the mind should come to indolent repose, we immediately teach the pupil that *i* has also the sound of *ee* in *feel*, as in *machine*, which sound is also expressed by *ea* in *eat*, *meat;* that *ai* has the sound of *a* in *fate*, as in *bait;* so that if he *baits* his hook with *meat*, the fish will *bite* at the *bait* in the *vain* hope to *eat* the *meat*. Then we inform him that the same *ei* which is sounded *i* in *height* is sounded as *a* in *weight* and as *ee* in *seize*, so that he must regulate the *height* of his *bait* by a *weight*, and *wait* for the fish to *seize* it. Next he must learn that *ie* has also the sound of *ee* in *believe*, so that he may understand the Scripture texts about "those who *believe* a *lie*" and "those who *lie* in *wait* to *deceive*," and that "a just *weight* and a just balance are the Lord's."

But if we stop in desperation and declare that we will give up all attempt either to know or teach English spelling, we find we are not to get off so easily. The horrors and atrocities that will be perpetrated by pupils who sit down to spell by the light of nature will make the hair stand on end and paralyze the circulation of the blood. All the inventions of Nasby and Josh Billings cannot equal the originality of a set of boys and girls in their ingenuous simplicity, reconstructing the English language as they write their compositions. But the world has no use for Nasby and Josh Billings, except to laugh at them. It is willing to pay for its laugh, but then wants to have done with it and attend to the sober business of life. There are typewriters and compositors who are not allowed to be facetious. It will not do to have the definition of 'petard" set up as "a device for making *breeches;*" the editor is forced to insist upon "breaches." Then there are the parents to reckon with, almost all of whom want their children to stand all ests in the traditional spelling. There are social invitations and notes to be sent out, some of which are sure to come under critical eyes. Even the office-boy who answers an advertisement "in the handwriting of the applicant," and spells *office* with an "*s*" and *sure* with "*sh*" will not get a place. You cannot help laughing at your butcher when he posts up "*Four* quarters of lamb 8 cents," or at he thrifty German who nails up a board over his door with the egend, "This house for *sail.*"

In fact, it is this irresistible comicalness of all phonetic spellng that has been the death of all phonetic systems hitherto. The very first impulse of any reader on running his eye over a paragraph spelled according to the sound is to laugh. Such spelling would make the most solemn passage of Scripture comical and an obituary irresistibly funny. Its general use in a cemetery would make all visitors hilarious. Such a tendency is the hardest of all hings to fight, and we may be well assured that it cannot be overome in one generation. Reform must be the work of time.

Nor must it be forgotten that since transference of thought is now so largely by the eye, a difference in the spelling of homonyms s a great incidental advantage. It is well to know at a glance whether we mean to give up a piece of land or to plant it—whether he land is to be *ceded* or *seeded;* to know whether one refers to the *ealing* of a letter or to the *ceiling* of a room. Yet even here our ystem is instantly knocked to pieces, because so many words that are pronounced differently are spelled alike, and the eye finds no difference between a *bow* manufactured by an Indian and *bow* made by the President. We are simply remanded to the context and to common sense.

We are shut up to simple facts. We have a composite language. The ancient Romans dominated the Britons till their own empire ell. The Saxons conquered the Britons and the Danes made inoads on the Saxons. The Normans conquered the mingled people, and the Church of Rome, with its Latin Bible and Latin literature, ubjugated victors and vanquished alike. The English blood never had time to stand still, and it gained such a facility of assimilation hat the people in whose veins it flowed could appropriate any word hat meant anything to anybody, make it English, and thrust it with ome combination of letters into the written language. So many makers were at work, and the spirit of individual independence was o strong, that they rarely troubled to confer, but each spelled words in his own way, so that the question has been raised whether Shakespeare knew how to spell his own name, even if we admit that it was not Bacon. Then this irrepressible stock went forth to conquer the world, and incidentally to appropriate any good word spoken by the men of any race under heaven, always giving it an English smack, but spelling it with a fine disregard of convention. The Crusaders knew well the crooked Turkish sword, but they did not know whether to spell it *simitar*, *scimitar*. *scimiter*, *cimitar* or *cimiter;* so they thoughtfully spelled it all these ways, leaving their posterity to reckon with the dictionary, while they fought the Moslem back from Western Europe. We have given this incongruous orthography a certain factitious unity, and crystalized it in innumerable volumes. We are not yet willing to make all this literature obsolete, and to read Milton and Byron and Tennyson, Macaulay and Prescott, Scott and Dickens and Howells and Mark Twain with a glossary. So there is nothing for it in our day, at least, but to spell "English as she is wrote," and, according to the Puritan ideal of religious liberty, "compel other people to do the same." It may be that this necessity, with the toil and strain it brings, has more to do than we think in making ours the world-conquering race, for one who has conquered English spelling can conquer anything. What are mountains and oceans and forests and savages, what are tropical jungles or ice-fields around the North Pole to a race that has mastered in youth's tender years the spelling of from 10,000 to 300,000 English words? Let us live up to our opportunities, as we must if we are to live at all.

How is this desirable result of correct spelling to be obtained? A variety of methods have been tried. Some would dispense with the spelling-book. The "word-method" had at one time a great vogue. Everything was to be left to the recognition by the child of the "word-picture." There is a great deal in the "word-picture" idea for reading, but it fails for spelling. Let any one try to draw a face that he has seen in a photograph, and that he would recognize at sight. He will find that recognition is a very different thing from reproduction.

"How many rounds are there in the back of your chair?" I asked a friend who was urging the word-picture theory of spelling. He started, then began to laugh, and said frankly, "I don't know." "Yet," said I, "that is your office-chair which you have sat in every day for ten or fifteen years. You would recognize a picture of it, but in order to draw it you would have to note particulars, and count the rounds." That is just what the speller must be taught to do with familiar words. He must know beyond the need of guessing how many "t's" and how many "r's" there are in the name of the sea that separates Europe and Africa. Numbers of advanced pupils cannot tell you that off hand. When all is said, English spelling is a matter of exact observation and arbitrary memory. The cultivation of these qualities is not to be despised. Every physician relies on them constantly in cases of life and death, every financier where millions are at stake.

In original endowment of these faculties people greatly differ. Of two brothers, one says, "I don't see how anybody who has once seen the word *robin* can possibly spell it *robbin*." The brother replies, "Well, I know it is one way or the other, but I can't remember which." So he would go off on the analogy of *bobbin* and *robber* and *robbing*, and be wrong. Yet that very guesser became a good speller by sitting down solidly for a year in his young manhood to the dictionary.

Just here is the place of the spelling-book. Words are dealt with as words, not as embodied thoughts. The attention is fixed on the form. Particulars are noted. Ever after, a word so studied can be taken to pieces and put together again. The certainty experienced is closely akin to that in a mathematical demonstration. It is the assurance of consciousness—the knowledge of the thing that we have done. There is a distinct sense of mastery and a gain in honorable self-confidence with this sense of certainty. Hence with a great number of thoughtful educators the spelling-book is coming back into honor. Somehow we must teach words as words, if we are to be able to reproduce them as words in worthy and workmanlike fashion.

This was accomplished by the stern "masters" of the olden time, who stood the pupils up in rows and "spelled them down." Men of that wonderful American race of the earlier day were able to do whatever they set their hand to—even to teach spelling. Modern research shows that their method was in accordance with the eternal laws of mind. Dean Shaw by experiments upon thousands of children in spelling meaningless words (simply written on the blackboard and at once erased) found that the initial and final letters were always best remembered, showing that the memory fastened most readily upon these termini; whence he infers that the spelling by syllables, as multiplying such termini, was a help in fastening the succession of letters in mind.

He found also that there was an almost unconquerable tendency to the *viva voce* repetition of the word to be spelled, and that where this was allowed freest scope the spelling was best, the motor activities aiding memory by multiplying the links of association on which memory so largely depends. Hence the old method of calling out word by word and syllable by syllable was psychologically sound. The method did work, and generations were taught to spell.

It may be that they devoted a disproportionate amount of time to this single study. We could not fit their entire system to the demands of modern days. The revolt against the mere word-lists of the old spelling-books is largely justified. The mind becomes very blank if forced to dwell too long on form without thought.

To meet this difficulty, books of sentences have been constructed. But the brightest intellect suffers a kind of paralysis in continuously making sentences to contain words. Mental stagnation follows the perpetual "arrest of thought." The sentences become wooden and and vapid, till that constructed by the adventurous lad, to contain the word *toward*, and which read "I *tored* my pants," becomes vigorous and refreshing in comparison.

But it is possible to combine the teaching of thought and expression with the teaching of words. The writer believes that children can as well learn to spell the words of selections that are beautiful in thought and diction as of sentences constructed merely to certain words. Few persons have observed how simple is the language in which the great masters of English literature have expressed their sweetest and noblest thoughts. It is in this that the simplicity needed for the teaching of childhood chiefly consists. The mistake is constantly made of giving babyish, or even absurd ideas, in the attempt at simplicity. Then the silly thought is often expressed in difficult words. But nothing is more remarkable than the readiness and fearlessness with which very young children will approach the greatest thoughts, if these are but presented in simple phrase. This is precisely what our greatest writers have continually done—and done in the most perfect utterances of their highest moods. Pupils carefully studying selections from Tennyson, Longfellow, Whittier, Byron, Milton, and Shakespeare, from Alice Cary, Adelaide Procter, Jean Ingelow, and Elizabeth Barrett Browning, from Carlyle, Emerson, Hawthorne, Irving, Kingsley, Willis, and Macaulay, will express their own thoughts better when they come to form sentences, and will have a higher and truer sense of the power and worth of words. The method is capable of indefinite expansion. Every teacher can be on the watch for selections at once simple and beautiful, write out such from time to time on the blackboard, have chosen words carefully spelled, and then have the pupils copy the whole, which will fix it in the mind, as nothing else can. It would be well to encourage such copying into blank books that can be preserved, and be the beginning of individual collections that may be of great value for mental training. Words are the coin of the realm of literature, and our children must learn to know the look and size and weight and ring of them, as well as their intrinsic value.

Meaning and Use of Words (Four Upper Grades).

By JAMES J. REYNOLDS, Instructor, New York City.

THE term "meaning and use" is familiar to the teachers of Manhattan, but, as it may have a different signification to other readers of the MONOGRAPHS, it might be well at the outset, to point out its limitations. Manifestly, our whole work in English deals with the right use of words, their meaning and logical connections. To use habitually, or to allow the use of words absolutely meaningless to the pupil would be to incur the wrath of educational reformers from Ascham to present-day magazine writers. Every lesson, every talk, every written exercise is, to a certain extent, a lesson in "meaning and use." The domain of word-study is as wide as language itself, and underlies the whole world of human learning; but, fortunately, our heading has no such wide application. Among the great mass of new words which come up during every term are a number requiring a critical study. Those are the "meaning and use" words of the Manhattan teacher.

The first question which naturally arises is, why the need of such a special list? Will not the usual spelling lessons, and the words found in the geography, history and literary work of the grade supply the necessary material? Undoubtedly, but many of those words must be necessarily of a nature which will preclude their use by the pupil. They cannot become a living part of his vocabulary. They are the words to be simply "tasted," not "chewed and digested." To linger with them or to try to force them on the child is a waste of time and a loss of energy. But the vocabulary grows upon what it feeds; it cannot develop if nothing is supplied. Words do not spring "full panoplied into action" at the teacher's behest. The poverty of language must be relieved, if not by the school, then by the home, and the "boys in the street." The duty to enrich the vocabulary—the every-day, usable vocabulary—belongs to the school. But tools laid away are frequently found rusty when most needed, so with the pupil's new language acquisitions. They must be kept before him, he must be drilled in their use, and for this purpose a special list of desirable words is necessary.

The principles which should guide us in the selection of the words to be critically studied are definite and simple. The child needs words *now;* he requires new symbols to express ideas and concepts increasing daily in complexity and abstractiveness. New relations are being recognized which, if they are to live in the mind must be stamped with an appropriate label, and *not* laid away on the shelf for future use. There are many nooks and crannies in the mind where those things become unaccountably lost. The salvation is constant use *now,* but how can we expect a 4-A boy of the lower east side whose highest conceptions of linguistic perfection are "swipe" and "fired" immediately to substitute "purloin" and "project." And why ask boys or girls of the same grade in the upper west side to spend twenty or more minutes per day in memorizing set definitions of words with the correct use of which they are perfectly familiar. The reading lessons are supposed to be so graded as to supply the needed language material, but does it not seem that some other criterion is required if the same readers are used by children of entirely different localities, in different stages of linguistic development, differing in everything except the brute fact that they happen to be in classes called by the same name? Of course, there is an advantage in selecting our "meaning and use" words from the class reader, but the guiding principle should not be, take the most difficult words of each reading lesson, but, select those words the child really needs (1) in that particular locality, (2) at that stage of his intellectual development. And what shall our test be? The ability shown by the pupil to use the word in conversation, in written exercises, in recitations. If the child will not, or cannot, use the words we have selected, the wisest plan is to revise the list.

The best method of making the selected word a real part of the child's vocabulary is an open question. At this point we find many practical educators differing. One solution offered is to have the pupil learn, by heart, a clear, definite, comprehensive definition of each new word, with practice in the formation of original sentences. Others tell us that such sentences usually afford excellent practice in the wrong use of words, and that definitions are more of a hindrance than a help. Collect, say they, series of sentences from the dictionary, reader and standard authors (long life permitting); encourage the pupils to do the same, and from a consideration of those sentences lead the pupil to form his own definitions. Both views have value, but the better method appears to be a combination of the two. The danger of allowing a set definition to be the sole guide in the use of the word has been admirably pointed out by Miss Le Row in her "English As It Is Taught," and further horrible examples are given in the METHOD MONOGRAPH, under Word Study. On the other hand, many of the sentences from dictionaries are as foreign to the child's comprehension as so much Greek. Endeavor-

; to teach by this so-called "development plan"—not only in this t in other subjects—is the reason for the complaint against vague- ss of knowledge. Let us meet the issue squarely. If we cannot, er a reasonable time, draw forth by skilful questioning a fairly rded statement of the meaning, then dictate. Yes, and have morized, an accurate, comprehensive definition of the word, a finition which really defines, not a synonym which requires ther elucidation. If we stop here, however, the pupil will be in e same fix as the boys who were taught to swim without going o the water. They sank. We must teach the meaning of the word using it in sentences, and this brings us to the kind of sentence to used. The artificial, stiff, namby-pamby, forced sentences, that we know, are practically valueless. Encourage the pupil to use the rd *naturally* in his ordinary work and life. He has desires, sym- thies and thoughts of his own which demand expression and ich must be taken advantage of by the teacher, if the new words e to become a part of the every-day vocabulary, and let not the cher forget that "example is better than precept," that constant e by her will tend to encourage use by the pupil.

A point that has caused much unnecessary difference of inion deals with the particular part of speech which should selected as "meaning and use" words. "Too many nouns." Don't use so many adverbs." "Have more verbs," are common mplaints. That there is any force in such implied criticism is ubtful. The child requires examples of every part of speech for lf-expression. With the young child the question might be im- rtant from a psychological standpoint, but with the older children thing practical seems to be gained by limiting our lists to adjec- es and verbs. Some years ago the writer made a study of a large mber of compositions written by pupils in the lower east side, and und that the preposition was the stumbling block from 4-A to 7-B. that locality the important prepositions might well be included in e teacher's "meaning and use" list. Verbs and adjectives lend emselves readily to the fascinating and instructive "word build- g," but this is not an advantage sufficient to cause the omission of l other parts of speech. In determining selection, far more impor- nt than the mere fact that the word is an adjective or verb, is the estion whether it is of such a nature that it will be a real acquisi- on to the child's vocabulary.

Thus far, we have dealt with the principles and methods under- ing the selection and teaching of single words. In our language, wever, we have groups or combinations of words in which the or- r of the elements is as rigidly fixed as in compound words. They e, in fact, words as far as meaning is concerned, though separated r convenience in writing. Those groups form a most important part of the vocabulary of every forcible writer, and the pupil should be practiced in their use. As examples of what is meant, take "for the sake of," "above all," "cat-and-dog life," "on account of," "good all-round man." Those, with hundreds of other similar examples are perfectly familiar to the adult, but are meaningless to the average child. Under the same head might come the verb and participle phrases. It is a common complaint that the present and imperfect tenses are used to the exclusion of all others. The imperfect participle is frequently found in compositions, but the other forms seldom, if ever. Niceties of language and careful discriminations of grammatical forms are not to be expected from children, but surely some knowledge of the correct use of the common tense forms would be valuable, and practice in them might well come under the head of "meaning and use" of words, especially in the lower grades.

Is our work completed when we have taught the meaning and the pupil can use the word properly? I believe not. There is another side in addition to what might be termed the utilitarian side of the study of words. Language is the most valuable heritage of the race. How valuable can never be appreciated until we get an insight into the history, the etymology, the finer shades of meaning of the word. The discovery that common, ordinary words can tell interesting stories when properly interpreted has been to many a child like the introduction into a new world. Who that has read "The Study of Words," by Trench, can forget the delight and surprise which came with the knowledge that words were living powers in which were stored up latent poetry, ethics and history. We all know how a short story will impress the meaning of a fact on the mind, and so the meaning of a word may be so correlated with its historical or etymological derivation as to stick in the memory for all time. What child will forget the meaning of "desultory," when its dictionary meaning is supplemented with the following: "Get at the image on which 'desultory' rests; take the word to pieces, learn that it is from *de* and *salto*, 'to leap from one thing to another,' as a man who is in the ring, technically called a 'desultor,' riding two or three horses at once, leaps from one to the other, being never on the back of any one of them long." This gives, not the usual weak hold of the meaning, but a vigorous grasp. Many of the most suitable "meaning and use" words are susceptible of similar interesting explanation, and all the necessary material will be found in Trench's "Study of Words" and "English, Past and Present." In the GEOGRAPHY MONOGRAPH, Mr. Straubenmüller has pointed out the value of a like study in the teaching of geography, and gives some excellent examples. Would it be practical to treat each of the words in this way in each grade? Not at all, but a peep might e given into the "beautiful realms beyond," and the greater interst engendered would amply repay the "looking up."

The value of a well-selected list of "meaning and use" words is onsiderable, but it is not of so much importance as to warrant it eing handed down from generation to generation. It is not an mmovable, unchangeable fixture of the grade, but should change emi-annually. Beginning at the first day of the term, it should grow at the rate of eight to fifteen (depending upon locality) per week. This does not mean that the old list is to be consigned to he trash basket. We hear much of the value of review, in fact, plendid teachers say it is five sixths of successful teaching; if this s so, would it not be well to give the last of the promoted boys our meaning and use" list and give an opportunity to the next teacher o review our work? This would do away with the fault of repeatng the same word term after term, long after it is thoroughly asimilated.

This somewhat general treatment of the subject would not be omplete if it did not include a short account of some practical deices which have been found useful in the teaching of "meaning and se." Comment is unnecessary, for every teacher knows that a deice which works well with one may be a complete failure in the ands of another. There may be better devices than the following; he best that can be said for them is that "they have been tried and *ot* found wanting":

1. The pupils every morning place in a box kept for that speial purpose the words which were not thoroughly understood in the ome lessons. Those are made the basis of the "meaning and use" ist.

2. The pupils are encouraged to bring in sentences from newsapers and magazines containing any of the "meaning and use" words. Those are pasted in a scrap-book and referred to constantly.

3. The words are written on strips of cardboard and placed on he walls of the room. This serves as a continual reminder.

4. Before each composition is written, a review is held of the words which seem applicable to that subject, and pupils are drilled n the formation of sentences dealing with the subject-matter of the omposition.

Divided Usage.

By WILLIS BOUGHTON, Teacher of English, Erasmus Hall High School, Brooklyn.

IT has been asserted that seventy-five per cent. of our children leave school before they have reached the age of twelve years; yet before their school days are over, they are expected to understand the proper use of words. Society is hypercritical in the matter of the language employed by man or woman. Business men demand clerks who use good English; the man of affairs, who blunders in spelling or in grammar, is pitied; the Mrs. Malaprop of every age excites laughter; therefore, the public school, whose pupils do not acquire a language characterized by good usage, is harshly condemned.

The teacher ought to be a zealous searcher after truth; yet in the matter of usage, often, he may propound the old question of eighteen centuries standing, "What is truth?" There is a difference of opinion about the usage of a sufficient number of common words and phrases and about the use of punctuation points and capital letters to cause the instructor many hours of fruitless labor.

A grammarian, whose book is used in a large number of the New York schools, says, "Begin with capitals the important words in the title of a book;" yet in the Regents' examination questions submitted to the pupils using that book, when titles are quoted, only the first word and the proper names of the titles are begun with capitals. The teacher of science may spell sulphur sulfur; the teacher of English finds the word thus spelled in a composition and marks it as an error, still the spelling is preferred by the Standard dictionary. Abbott [How to write clearly, pp. 17-18] has specific rules for the use of "which" and "that," while Hill [Foundations of Rhetoric] says, "Euphony decides between WHICH and THAT." Fitzedward Hall asserts that lexicographers and grammarians "have no right to . . . palm off their own whims and theories, as if the net result of the most approved usage." [Modern English, p. 38.] Professor Lounsbury is still more emphatic, declaring that "he who seeks to preserve the purity of the English tongue in America, will never do anything effective towards it by insisting that this word or phrase must be used and not that; that this pronunciation shall be adopted and not some other; that this particular rule of syntax shall be vigorously oberved, and that anathema shall fall on all who violate it." [International Review, VIII., p. 608.] The climax seems to be reached n Professor Carpenter's statement that "when usage seems to differ, one's own taste and sense must be called into play. [Rhetoric and Composition, p. 24.]

This kind of teaching is wiser in inverse ratio to the ages of the pupils. In this paper we are dealing with pupils of the elementary school grades. In the matter of usage, first, the psychologist has to be satisfied. With young pupils there are some dangers to overpass.

Divided usage when called to the attention of young pupils may promote indecision. A teacher of fifteen years' experience asserts that the indecision caused by the use of two forms of the capital letter "S" costs him valuable time. Sully says that a child's first general ideas are "commonly wanting in distinctness and precision." Professor James touches the point more closely when he says, "We must make automatic and habitual, as early as possible, as many useful actions as we can. . . . There is no more miserable human being than one in whom nothing is habitual but indecision. [Talks to Teachers, p. 67.]

Divided usage, if allowed in the early years of school, may promote slovenliness; Sully says, "The dangers of a slovenly, vague use of words can only be averted by seeking to form in the pupil's mind from the outset a habit of making his notions as clear and distinct as possible." Every language teacher knows how necessary it is to have a right way and to insist on the pupil's using the right way. A little laxity may induce habits which are difficult to correct. "Each lapse is like the letting fall of a ball of string which one is carefully winding up; a single slip undoes more than a great many turns will wind again."

Then there is the habit of doubt, the mind is in a state "of conflict or baffled activity." Laurie says that "all knowledge, as it is acquired, must be exact, if it is to afford a sound basis for further organic growth." There cannot be exactness where the child is taught that one of two or three forms is suitable. The child may come to doubt all authority and choose forms which are objectionable from every point of view.

On the other hand it is of advantage to the child to have divided usage brought to his knowledge at as early an age as it is wise to do so. There is no time for unlearning or for correcting misleading statements. The child at any age demands to know the truth. Truth to the pupil is based on authority. The child demands authorities in the matter of language, and is injured if his authority is shattered. He is an imitator and finds his first authority in his home.

The home environment may not fulfil the ideal conditions of an authority in usage. In what may be called "select homes," good usage is not in vogue; the parents are not informed on the subject of usage, or in practice, are indifferent as to the language used by themselves or by their children. The children of foreign-born parents are totally ignorant of what constitutes good use; while those from the homes of "the people," have acquired at home a questionable usage. Parents are likely to vest all authority in regard to language in the teacher.

School environment, however, in respect to usage, is seldom more satisfactory or wholesome than that of the home. Our teachers, in many instances, were reared in homes where the character of the language was of little or no concern. They, as well as the pupils, are learners. The teaching force is recruited from the body of graduates of training schools and colleges. These new teachers are often immature, are ignorant of what constitutes good usage, or are indifferent about the subject. The conversation of college-bred teachers even is too often characterized by college slang and unwarrantable colloquialisms. Not from such will the pupil learn good usage. Finally, teachers are likely to be narrow in their reading, sectional in their opportunities for observing, and otherwise unqualified to perform the offices of advisers in the matter of usage. Yet the child must have an authority.

From what has been said it is evident that the home is not an authority on usage, unless it is your home or mine; the business or professional man is not, because he lacks the information proper to be one; the newspaper is not, because it represents the usage of a time that antedates our own; the teacher is not, unless he is alert, observant, widely-read, watchful over his own speech, and progressive. Even the best prepared teacher must have at his elbow his Maxwell, his Carpenter, his Century and his Murray.

But language is changing. The new editions of rhetorics are every year modifying their "don'ts" and their "must's." No progressive teacher is to-day using a vocabulary identical with that which he employed five years ago. The miniature Webster and Worcester, so often the valued companion of the public-school pupil, is misleading almost to the point of viciousness. To the present grammar school generation, the Century and the Standard are not absolute authorities on usage. The teacher needs an authority that is fully abreast of the times, and the pupil demands one on which he may rely. Such an authority may be furnished.

The United States Commissioner of Education might be allowed a force of competent assistants whose duty should be to gather data on usage. As a result of this work the Bureau might, at intervals of four years, publish a dictionary of variables in our language—

variables in spelling, in pronunciation, in meaning, and in general usage. Such a volume, widely circulated, might be companion and authority in the home and in the school, for the teacher and for the learner. In grammar school, in high school, in college, every new generation of pupils would thus be provided with an unerring authority—a volume that would satisfy the demands of the one who is searching for truth as well as of the one who is seeking the best mental discipline for the child.

Of course such a book would recognize a divided usage, but it would avoid some of the objections already discussed. An edition would remain an authority for a period of years. Every new edition would originate from the same source as the old. It's preferred usage would represent that of the people of the entire country. The philosopy of change, based on the development of the language, could more readily be accepted than when changes are presented by self-appointed dictators. There would be less shock or disappointment when the child realized that his authority was a variable one. Finally with such a book the teacher might hope to keep up with his age, and the learner to leave school fully abreast of the time in the matter of vocabulary and usage.

The Choice of Words and the Discrimination of Synonyms.

By HUBER GRAY BUEHLER, Author of "A Modern English Grammar," "Practical Exercises in English," etc.

THE practical questions suggested by the general topic, "The Choice of Words and the Discrimination of Synonyms," are two: First, when should we begin to teach the pupils to distinguish between synonyms; and second, how shall we teach them so to distinguish?

In answer to the first question, it should be noted that if the words are properly chosen with due regard for the pupil's state of maturity, the study of synonyms can hardly begin too early. It is, of course, obvious that many so-called synonyms mark different shades of meaning entirely beyond the comprehension of young pupils, who are not yet able to understand the things which the words denote. For example, no one would be foolish enough to ask a child to learn the difference between "supernatural" and "metaphysical." But on the other hand there are many synonyms which denote different shades of meaning easily comprehended by the youngest pupils in our schools. For example, the words "mound," "hillock," "hill," "knoll," and "mountain" denote objects which are easily distinguishable by youthful minds; and there is no good reason why a young pupil should be allowed to make one of these words do duty for all the rest. Similarly, pupils can begin very early to distinguish between such terms as "river," "stream," "rivulet," "brook," "creek" or "rock," "stone," and "pebble." As all teachers know, the tendency of young pupils is to overwork the words which they already have at command rather than take the trouble to learn others slightly different in meaning. But even young pupils can be easily made to take an interest in the study of synonyms if the words selected for study denote shades of meaning which are not beyond the pupil's experience. The important thing is to avoid getting ahead of the pupil's state of maturity.

With regard to the second question, "How should the discrimination of synonyms be taught?" the answer naturally divides itself into two parts.

The first way of teaching synonyms is connected with the study of literature. When pupils are studying a piece of literature and learning the meaning of unfamiliar words in it, the teacher should be ever on the watch for opportunities to draw attention to the differences in words of related meanings. For instance, if the word "dingle" comes up for the first time, it gives an opportunity for the pupil to become acquainted with the difference between a "dell," a "valley," a "vale," a "ravine," and a "glen;" or, at least, some of them. The possibilities of this form of instruction are limited only by the watchfulness of the teacher and the time at her command.

The other way of teaching synonyms is connected with composition work. The written exercises of pupils will present many instances of misused words, and each of these instances should be made the occasion of a lesson on synonyms. This method of handling the subject seems so obvious that it is not necessary to dwell upon it.

The following books have been prepared to give special assistance in this part of English teaching: Roget's Thesaurus of English Words (T. Y. Crowell & Co.); Soule's Dictionary of English Synonyms (Little, Brown & Co.); English Synonyms, Antonyms, and Prepositions (Fund & Wagnalls Co.), and Buehler's Practical Exercises in English (The American Book Co.).

The Use of Topical Outlines in Composition.

By Susan Adele Lathrop, Horace Mann School, New York.

COMPOSITION in elementary schools includes two lines of work the "technical," involving questions of sentence forms and structure, punctuation and diction, and the "thought side," which deals with the selection and organization of material. It is the purpose of this article to discuss the relation of topical outlines to this matter of "organization of material," and to make some practical suggestions regarding the use of such outlines in securing the aims of composition.

Writing is a means, not an end; a mode of expression. Given a full mind, definite perception of the relative values of each part of the subject, and clear comprehension of the relation of these parts then, composition ceases to be a vague attempt to state thoughts which are not in the writer's mind, and becomes an intelligent effort to arrange and express ideas in the best possible manner The aim of composition is to say something, and say it well; to secure freedom, fluency, clearness and force of expression. Clearness in writing presupposes logical sequence of thought.

The topical outline is not a device for securing organization of material, to be used here and omitted there; it is the material organized. It is the necessary plan of work, either in the mind or on the paper. An artist making a sketch may draw in the outlines full and clear, without apparent preliminary arrangements, measurements, proportion and blocking-in. But if the completed sketch is satisfactory, if it conveys the artist's thought clearly easily, forcibly, all the unseen preliminary steps are there. They must be evident in the completed whole, though they have not been formally put on the canvas. Accurate "seeing," involving proportions and values and relations, must underlie correct and effective drawing. So clearness in writing presupposes logical sequence of thought.

Some writers have a keen sense of the natural fitness, the relations and sequence of ideas, and are able to arrange the entire composition while writing. Very few can trust themselves to omit all preliminary plans. Native ability or long practice in orderly thinking serves to make the formal steps less apparent, but not to abolish them. Not to outline one's thoughts, but to think in outlines, is economy of time and effort.

Training in the fundamental principles of order, proportion unity and clearness should begin with a child's first written work Oral as well as written statements of general topics may be used as a guide in reproduction and construction. The function of the topical outline is to aid in the logical development of the theme, the orderly arrangement of the parts of the whole composition, and in the establishment of unity and coherence. But effective composition aims also at freedom, ease and spontaneity, and there is great danger of sacrificing these to definiteness and rigidity of form in too great adherence to an arbitrary plan. An outline should be a support, not a fetter.

Practice in analysis and arrangement of one's own thoughts and ideas is inadequate. Hand in hand with this should go the analytic observation of the methods of good writers. A child soon learns to distinguish the introduction and conclusion from the body of the story, the important transitions and order of events in a narrative, the change from topic to topic in a description.

The few important headings in the history or science or geography lesson, written on the blackboard during the development of the lesson, serve to emphasize the order and relation of steps. Topical recitations, topical reviews, topical questions, strengthen the habit of logical and coherent thinking. The making of outlines from stories, poems, books, chapters, lessons, etc., either in preparation or review of a lesson, even when further elaboration is not required, is exceedingly valuable as an exercise and test of the analytic power of the individual.

Outlines made by teacher, class, or individuals will vary according to the subject under discussion or the writer's point of view, but should in general conform to the following characteristics: 1. The main topics should be few and general, with necessary subdivisions indicated. 2. There should be logical arrangement, so that the list of topics shall include the whole subject without repetition of thought. 3. The topics should be coordinate, and should be stated concisely but definitely.

A few examples of topical outlines made by children between ten and thirteen years of age are here submitted in evidence of what may be done under average conditions.

I. (*a*) First steps in outlining. Preparation of lesson on Browning's, The Incident of the French Camp: 1. Introduction. 2. Napoleon and the boy. 3. The boy's death.

(*b*) Same outline revised and elaborated after completing the study of the poem (used later in composition). The Incident of the French Camp: 1. Introduction; time and place of the event. 2. Characters.

I. Napoleon. 1. His appearance. 2. His thoughts.

II. The Boy. 1. His arrival. 2. His appearance. 3. His message.

III. How the message was received.

IV. Climax.

II. Study of a history lesson. Analysis of a chapter. (Preparation for recitation.)

(*a*) The Barbarians. 1. Who they were. 2. Where they came from. 3. How they lived.

(*b*) Topical questions for review. The Barbarians. 1. Who were the "Barbarians"? 2. Where did they come from? 3. What were the principal tribes? 4. Where did each one live? 5. What kind of homes did they have? 6. How did they get their living? 7. What were their occupations? 8. How did they amuse themselves? 9. What sort of government had they? 10. How did they elect a war chief? 11. What did he have to do?

(*c*) Outline expanded and used in composition.

The Barbarians. I. Their home. II. The principal tribes. III. Their manner of living. 1. Houses. 2. Food. 3. Occupations. 4. Amusements. 5. Government.

III. Review of history lesson (used in composition).

The First Crusade. 1. Causes. 2. Time. 3. The leaders. 4. Their arrangements for the journey. 5. The route. 6. Sufferings and dangers on the way. 7. Events at Antioch. 8. Arrival at Jerusalem. 9. Results of the crusade: (*a*) In the Holy Land. (*b*) In Europe.

IV. Outlines for composition from literature work.

The Legend of Sleepy Hollow. Subject chosen: "Ichabod's Last Party."

I. The Merrymaking. 1. Invitation. Peace and manner in which it was received.

II. Ichabod's preparations. 1. Close of school. 2. Dressing. 3. Horse.

III. Ride to the party.

IV. Entertainment. 1. Dinner. 2. Dancing. 3. Story-telling.

V. The Ride Home. 1. Ichabod's feeling at the start. 2. His adventures.

VI. Ichabod's Disappearance. 1. How it affected the people Hans Van Ripper; the village women; Brom Bones and Katrina.

Letter Writing: A.—Business. B.—Application and Inquiry.

By Edward J. McNally, Instructor, New York City.

THE subject of letter-writing is one on which so much has been written that a claim to originality would be as futile as it is unwarranted. My efforts have been to examine many authorities and to gather from them suggestions concerning the most salient features of this subject. While I found practical unanimity as to the essential qualities of a letter, I noticed in some instances certain differences of opinion as to form. In most of the cases I have presented what I consider to be the preferable, while in others I have referred to two forms.

Letter-writing being a branch of composition, can claim for itself all that can be said in a general way of the latter. For example, it teaches the writer to reflect, in order that he may reproduce what is in his mind. It is pleasure-producing in the sense that a "consciousness of power" is experienced. But beyond this, it demands emphatically an accuracy not only of statement, but also an accuracy in following a prescribed form. And in practicality and frequency, letter-writing stands preeminent among the branches of composition.

A.—Business. All that may be said of the importance of letters in general will apply with even greater force to *business letters*. The occasions that call forth their writing are so numerous and so varied as to warrant the careful consideration of their essentials. Of these something will be said later. Just here I wish to call attention to a single point—*carefulness in statement*. The great difference between the effect of the spoken and of the written word may profitably be dwelt upon in our talks to young letter-writers. The fact that a business letter may some day be brought in evidence against the writer should impel us to advise our pupils to be most careful about their written statements, especially about the making of business promises. We should urge upon them the necessity of the careful perusal of every letter before posting it. The following words of Mr. E. H. Lewis are in this strain: "A shrewd politician knows enough not to write too many letters, and not to write anything that he cannot stand by."

I am of the opinion that much better results would be obtained in letter-writing if more attention were paid to securing the *confidence* of the child. This is obtainable through arousing the interest of the class in general. Let the preparatory oral work be of such a nature as to stimulate each child to contribute a part.

In this way material is secured for a letter which is the work of all. This should be followed by the reading and the handling of sample *bona-fide* letters from business houses. The pupils having now the *material* and the *form* are in a position to write individual letters. Some of these may be sent to business houses.

We may now consider the subdivisions of the letter. I have adopted the terms generally accepted:

I. Heading. II. Introduction. 1 Address. 2 Salutation. III. Body of Letter. IV. Complimentary Close. V. Signature. VI. Superscription.

Under each of these I consider it necessary to mention only a point or two peculiar to business letters.

I.—Heading. The heading should include all the particulars that the receiver of the letter will need for directing the reply. Generally, this would mean the number of the house, the name of the street, the name of the city and the name of the state. The date then follows.

FORMS OF HEADING.

251 Delaware Ave., Buffalo, N. Y.,
May 25, 1901.

234 Pennsylvania Ave.,
Washington, D C.,
Jan. 4th, 1897.

II. Introduction. 1. Address. 2. Salutation.

1. *Address.* The address includes the name, the title and the place of business of the person to whom the letter is written. In addressing a business-man, *Mr.* is better form than *Esq.*

2. *Salutation.* The salutation is the greeting of courtesy that is used. When writing to a firm of business men, *Dear Sirs* or *Gentlemen* is proper. When addressing an association or committee of women, use *Ladies.* The use of *Dear Sir* when addressing one man offers no difficulty. The salutation *Dear Madam* is applied to a woman, whether married or unmarried.

FORMS OF ADDRESS AND SALUTATION.

Messrs. J. P. Hutchinson & Co.,
220 Park St., Boston, Mas
Gentlemen,—

Messrs. Johnson & Williams,
45 Central Ave.,
St. Louis, M
My Dear Sirs:

III. Body of Letter. Since the custom in business is to ha the address precede the salutation, the proper form is to beg the body of the letter on the same line with the salutation.

IV. Complimentary Close. The complimentary close is th term applied to the closing words of respect. The for most common in business letters are:—Yours truly, Yours ver truly, Very truly yours, Yours respectfully, Yours very respectfully, Very respectfully yours. No abbreviations should be used.

V. Signature. In the signature the name should be written in full. Such a signature as:—*R. E. Anderson* would throw no light on the question whether the writer is a man or woman; or, if the latter, whether married or unmarried. Thus considerable doubt would be raised as to the title to be used in directing a reply. *Mrs.* or *Miss* may be placed in parenthesis before the signature. The best form for an unmarried woman to use is to sign her name in full and at the left of her signature to write the proper directions for a reply.

FORM.

Yours very truly,
Mabel Johnson.

Please address:—
Miss Mabel Johnson,
235 E. 84th Street,
New York City.

VI. Superscription. In addressing an envelope no punctuation is necessary after the different lines, except the period in the case of abbreviation.

FORM.

Mr. John J. Hall
Cor. Canal and Hudson Sts.
New York city

The essential qualities of a business letter are: (*a*) Legibility, including neatness: (*b*) Conciseness, so far as is consistent with completeness: (*c*) Courteousness.

(*a*) *Legibility.* The pupils should be led to understand that business men have very little time to waste in attempts to solve the mysteries of poor or careless penmanship. They should also be given to understand that letters lacking in neatness are very apt to find their way to the wastebasket. Especially is this the case with letters of application for a position.

(*b*) *Conciseness.* By conciseness is not meant abruptness. The subject matter must be clearly and fully stated so as to permit of no mistake concerning its meaning. At the same time the writer should do this in as few words as possible. All matters of a social or friendly character should be rigidly excluded.

(*c*) *Courteousness.* Under thishead the pupils should be warned to be especially careful in their use of the salutation and complimentary close. They should also be advised to refrain from the use of brusque remarks even when called upon to answer a rude letter.

Of the business letters which the pupils may be called upon to write the following are suggested:

(*a*) An order of goods. (*b*) The answer to an order of goods.

(*c*) The forwarding of check for goods received as ordered, or, (*d*) The statement of cause for refusal to accept goods.

The answer should be carefully read to see that reference has been made to every point contained in (*a*).

Other instances of business letters are:

1. Answer to an advertisement in a newspaper concerning real estate.
2. Renewing subscription to a magazine.
3. Notice to publisher of a newspaper of a change of address.

B.—Application and Inquiry. Letters of application and inquiry very often come under the head of business letters. They are, however, of such frequent occurrence as to deserve special treatment. The first letters that the great majority of pupils will be called upon to write after leaving school will be either letters of application or of inquiry.

From the following lists of subjects for *letters of application*, selections may be made for class-room work: For position. For letter of recommendation. For permit. For samples. For loan. For reimbursement for damages. For catalogue.

In all instances, particular emphasis should be laid upon neatness. In a letter containing an *application for a position*, too much attention cannot be given to a proper statement of *qualifications, experience and references.*

The following are suggested as suitable subjects for *letters of inquiry:*

Concerning course of study in a high school or college. Concerning summer rates in a country boarding-house. Whether any vacancy exists. Requesting an interview. Why certain goods have not been forwarded.

It is well to inform the pupils of the necessity of enclosing a stamp for a reply when asking for a favor, and of the advisability of doing so in certain other instances.

I would urge teachers to make letter-writing as realistic as possible, to make the pupils feel that they are playing an important part in business transactions. In addition to trying to get them to write letters properly and address them properly, it is well to let the pupils see the effect of carelessness or error. Under this head a discussion of the Dead Letter Office would be of much value.

In conclusion I wish to state that of all the subjects of the school curriculum none is more practical, none may be made more pleasure-producing, none should appeal to us with a greater sense of our responsibility, none should be more powerful in calling forth our best efforts than the *subject of letter-writing.*

Letter-Writing—General and Introductory.

By J. I. Milsner, Instructor, New York City.

OF ALL the subjects in the school curriculum none is more important than that of Letter-Writing. The majority of the subjects we teach are preparatory to the work which the pupil intends to follow at some future period, whereas letter-writing becomes useful at once. Therefore I deem it deplorable that we find so few scholars in the higher grammar grades who possess the qualifications necessary to the correct writing of a business or social letter.

As practice makes a good reader, a good speller or a good penman, so in order to make competent letter-writers we must have constant and persistent practice in correct methods.

In order to study the art of letter-writing, we may divide the subject into two parts.

(1) Structure. (2) Expression.

Under Structure we have (1) Materials. (2) Arrangement. (3) Penmanship.

Under Expression we have (1) Spelling. (2) Punctuation. (3) Grammar. (4) Choice of words. (5) Style.

Let us now take up the Structure of the Letter.

1. *Materials.* As materials are furnished us we may dismiss this point, only remembering that we cannot expect excellent workmanship without excellent tools.

2. *Arrangement.* In regard to form there is little difference between a social and a business letter; we always find the following: (1) Address. (2) Date. (3) Salutation. (4) Body. (5) Complimentary close. (6) Signature. And I believe no pupil should be asked to write a letter unless he understands perfectly how to arrange it. A teacher of a 6-A or any higher class should not find it necessary to put the form of a letter on the board, and yet that is what he must do.

Penmanship. Nothing will please the recipient of a letter more than one which is written in a plain legible hand; and none will disgust one more than a slovenly, misspelled epistle; for in a great many cases a word because of the ambiguity of the penmanship is wrong to the eyes of the reader. Constant practice in arm movements I find the best means for learning that free round hand so much admired by all.

Expression. Since we express our thoughts through words we must be able to spell correctly, combine the words correctly, punctuate correctly and use the right word in the right place.

Spelling. Special stress must be laid on the spelling of common words. What man would employ an amenuensis who could not spell the simple words? And yet we find such words as too, to, hear, here, recommendation, reference, and so forth, spelled wrong time after time. Dictation of letters therefore is an excellent device for finding mistakes in spelling and taking measures accordingly.

Punctuation. In an elementary school there is neither time nor need for teaching such marks as the semicolon, colon or dash, so that if we can teach the correct use of capitals and the comma we have done all that may be desired.

The following words should begin with capitals:

1. The first word after a period and usually after the interrogation point and the exclamation point.
2. Divine names.
3. Proper names of person, places, rivers, oceans and ships.
4. Adjectives derived from proper names of places.
5. The first word of an exact quotation.
6. The pronoun I and the interjection O.
7. Terms of great historical importance, as The Reformation, The Civil War.

Rules for the Comma. A comma is used in the following instances:

1. To separate intermediate, transposed and parenthetical elements from the context; as "Even good men, they say, sometimes act like brutes."
2. To separate expressions in apposition from the context; as "Washington, the first president, served two terms."
3. To separate contrasted words or phrases; as, "We live in deeds, not years."
4. Before short and informal quotations.
5. To mark the omission of words.

Grammar. In the words of A. S. Hill, "Several hours judiciously used should suffice to teach an intelligent boy the few points of grammar which it is necessary to know." It a well-known fact that bad grammar in composition means what is called false syntax; and if every teacher should be always on the watch for the errors which are given below the pupils will have mastered what seems so difficult to some—correct expression.

Common Errors. 1. Use of a singular verb with a plural subject and reverse.

2. Confused use of the past tense and past participle of verbs.
3. Misuse of pronouns.
4. Confusion of adverbs of manner with adjectives that qualify.
5. Double negatives.

6. Wrong use of shall and will.
7. Superfluous words.
8. Erroneous use of prepositions and adjectives.

Choice of Words. In order to make our pupils more adept in e choice of words, we must impress upon them the utmost portance of simplicity and directness in their language. They st know that the strength of sentences lies in the nouns and rbs and not in the use of flowery adjectives; that the simpler the rds the better; and that unity and clearness must ever be the tchwords. *Use the dictionary,* should be the teacher's advice at times; and no counsel on the part of the teacher will have more itful results than that.

Style. A good style is a gift, and though we try ever so hard cannot acquire it; still, by studying the best authors, such as well and Burroughs, we can get that charm and courtesy in our ters which makes a good letter-writer a person of marked dis- ction. As a rule we should write as we speak; but as our speech more formal at a public meeting than it is in private conversa- n, so in writing to a stranger we should be more formal than iting to a friend or relative.

I have treated letter-writing solely as a division of composi- n, and such I believe it is. In fact, it is the only form of mposition our pupils, with a few exceptions, will ever be called on to write. How many will ever be called upon to deliver a eech or compose a story? Very, very few; but who will not at me time in his life be asked to indite a few words either socially in business. I must therefore impress upon you again the most importance and *practicability* of letter-writing. I give low an outline of the letters one may be called upon to write at e time or another:

- Social
  - Formal
    - Wedding Invitations.
    - Messages.
    - Acceptances.
  - Informal
    - Inquiry.
    - Introduction.
    - Sympathy.
    - Gallantry.
    - Advice.
- Business
  - Inquiry.
  - Application.
  - Orders.
  - Letters of Recommendation.
  - Circulars—Advertisements.
  - Telegrams.

Personal Narration.

By J. A. Atkinson, Instructor, New York.

THE successful writer, like the successful business man, usually acquires his power by easy stages from the humblest beginning. Genius or aptitude need not be considered if one but begins at the bottom and grows into the work by successive and easy steps. Mr. Vreeland tells us he worked up to his present position as manager of the city railways from the position of switchman. The possibilities of a boy who begins his life systematically doing so simple a thing as keeping a diary are very great. There is no reason why every schoolboy should not be required to keep one. Such an exercise fosters habits of carefulness and accuracy. If a boy might stop at intervals, once daily, for example, and take cognizance of what he is doing, and somehow tabulate his thoughts and experiences before they whisk out of his memory, he would certainly be much the wiser for it. His care and observation might be practiced outside of the school and outside of books. The world at large is of more interest to him than the school. His experiences at home and on the street rule his thoughts more than do his books, and the ideas he gets during his hours of play and freedom enter into his life quite as much as do those he gathers while at school and at work.

As the teacher employs herself with art, with literature or with needlework as an avocation, so the pupil might be induced to keep a diary of some kind for diversion. With good management pupils will do whatever is expected of them and will undertake as a pastime what might well be a routine duty of the school. They will become more enthusiastic over a side line than over any work they are compelled to do, and the less they are constrained to follow it up the more interest they will probably take in it. They may be enlisted through some interest to which they already devote considerable attention. A boy who is interested in the Stock Exchange will gladly tabulate the daily quotations of Standard Oil or Northern Pacific stock and report upon them whenever required. Another boy will be interested in ocean traffic and will keep a record of the *Campania* or the *St. Paul*, including cargoes and passengers. Others watch the theatres, the Zoological Gardens, the Aquarium, or the progress of the subway.

It is common among boys to make collections of one thing and another, according to their tastes, but they do not usually make personal notes of their own accord. The one, however, is so nearly allied to the other that pupils can be led to shift the practice of clipping for a scrap-book to that of entering personal notes in a journal. If a boy is in the habit of underscoring passages in the book he reads, have him copy the passages in a note-book instead, and, upon finishing the book, write out his impression of it in a few lines. If he is watching athletic games have him make entries in his day-book. If he is of a literary turn he has an abundance of materials to work upon.

A boy under my observation has clipped this year from the *Sunday Herald* all the articles on literary people by "Pendennis," and can give a detailed account of Mark Twain, James Lane Allen, William Dean Howels, Ernest Seton-Thompson, Mrs. Burton Harrison, and many others. He keeps a record of literary events and of personal characteristics of authors. In addition to the important data he will have in the course of a few years, he will have gained such facility in observing and reporting facts that he will be able to write a history of his subject in a creditable way. Gradually and unconsciously he is imbibing those principles which will fit him for reportorial work, and eventually for literary criticism. Pud'nhead Wilson, in whom there is as much truth as fiction, made it a practice for years to gather thumb-marks on waxed tablets as a part of his calendar, and by their assistance won an important suit at law which made him famous. Careful and persistent note-taking is almost sure of an ample reward. It is well to traverse the ground early and from the bottom.

Unconscious is better than a too conscious practice in the use of English, especially in the more elementary stages. The simpler the practice at the beginning the better; for that reason, taking notes, making records, or keeping a diary makes a good beginning; but the recording of facts can be supplemented by the recording of impressions. The one can be shaded into the other, and the pupil thus unconsciously be led to his first steps in originality. In addition to recording the events of the day the pupil records his impressions of them and even his own reflections and prominent thoughts. He thus begins to acquaint himself with the workings of his own mind. He need not be a psychologist or wait for maturity before he ventures to investigate the processes of his mind. It is well if he becomes acquainted with his thoughts as early as possible and begins to rely upon them. A wholesome respect for his own thoughts and feelings lends tone to his character and tends to give him force and individuality. A boy is usually too ready to doubt himself and to believe he is not entitled to a personal view of things until he is grown. His modesty is shown in his usual reply when he is asked to write: "Do tell me what to say; I can think of nothing of interest." He feels that his thoughts are trite, and loses respect for them and suppresses them. Thus begins the process of extinguishment so common with a sensitive boy. He follows passively the ideas of others and places little value upon his own; but his own habits and resources of mind, commonplace as they may seem, are the very capital that must back everything he undertakes. It is not supposable he will say something entirely new, but he should know when he has an idea and be able to record it in effective language.

A boy's self-consciousness, when be attempts to express himself formally, is a foe he has always to contend with. The less formal his composition-work the more natural he will be. That is the argument for approaching the subject under an assumed title. The diary, aside from its practical and pedagogical significance, is always an available subterfuge with which to beguile the boy into a simple and easy style of expression. There is ample to express, but the process intimidates and the flow of ideas is checked. If it were as natural to write words as to whistle a tune he would portray humor and ideas galore without a moment's hesitation, whether they are worth while. The boy is all expression, but written words are not his most convenient vehicle. He has not used them enough to have facility with them. He reveals himself through song, speech, gestures, drawing and play instead. It is common to see a boy absorbed with embodying his feelings in a drawing of one of his schoolmates. If his skill with phrases exceeded his skill in drawing he would express his feelings in words instead of drawing a caricature.

Out of such practice as has been suggested the boy is enabled to keep an intelligent diary. He is to make daily entries, still without a too conscious effort to attend to his English. With practice comes larger and fuller entries. The making of phrases becomes a matter of considerable ease and the boy begins to feel a kind of pride in the facility with which he can coin them. He makes steadier and more rapid progress than in his set composition work, and all the dread and strain is eliminated. Like Norman's method it leads him to a knowledge of the language by short and easy steps.

He gains strength also by a study of what he has done during a certain period. When he reviews his notes he has a measure of his progress. The review gives him a knowledge of himself such as he could scarcely acquire otherwise, and serves to correct him in many ways and to guide him in the further conduct of his diary. All that he has thought and done is before him and gives him a profile view of himself. The trend of his thoughts, the course of his conduct, his attitude toward things, and his manner of recording them are all there. His daily entries through the course of a quarter or half year become a revelation to him and show him his character in epitome. He may systematize any series of facts into a general summary as he would close a ledger. He may collect the related points and make them the basis of an interesting narrative. He may classify data at will and arrange a complete report upon his principal interests.

With practice of this kind he is fitted to take notes upon any special occasion and upon his travels, with a view to embodying them later into a detailed sketch of his experiences. The making of notes is an elementary exercise, but to arrange them in a pleasing narrative requires more or less ingenuity. The success of the exercises depends upon their being practiced constantly, and upon a gradual progress from the simpler to the more complex. Personal narration is at once the easiest and most difficult form of writing, and is well suited to develop the boy's power to use the language. From the simplest statements he advanced by gradations to a style of writing which required much originality.

When a boy is expected to write an essay outright he is likely to cram for it. If his subject is the automobile he will probably read all the literature he can find on the subject This is well enough, and gives him a knowledge of affairs, but it has not the educative value that is derived from writing about his experiences, and thus studying himself in relation to affairs. It is more a mechanical and less a natural process. The boy feels that his personality does not enter into the task. The work is entirely outside himself, and he brings no personal resources to bear upon it. He is merely an agent appointed to record certain facts that he can acquire in a given space of time. It is an external thing, like the study of mathematics. Whatever has not the personal or human element in it is not apt to possess the interest that attaches to a subjective theme, and the language will be mechanical and lacking in vitality. The boy's enduring interest lies in those things that pertain to himself. He loves to read novels and biography because they reecho his own feelings. He likes to see himself in the checkered career of Oliver Twist and to realize his own ambitions in the life of Lincoln. Through other characters he interprets. The actions of his schoolmates are important because they arise from the same impulses he himself feels. Whatever he can interpret in terms of himself or construe into an interpretation of himself has a vital significance, and the language he uses in connection with such themes is energetic and seems more a living thing.

The one method tends to fill in, the other to lead out. The one is a study of environment apart from the individual, the other is a study of the individual in relation to environment. The one fosters growth by acquisition, the other calls out, expands and enriches the inward nature. The difference between the two is the difference between the logician who dispassionately calculates the outward order of things and the poet who gives himself forth owing to the stimulus of outward circumstances. The boy is a thinking, feeling and willing organism and the producer of knowledge. The nature of his organism is more than learning. His consequence arises from what he is.

Narration.

By I. Edwin Goldwasser, Instructor, New York.

IN the preparation of work for class-room purposes teachers should understand that the mere laying down of a plan does not constitute the entire labor of a conscientious teacher. To be successful an instructor must view his work from a point of view far above the immediate needs of his position. In school work, as in life, the man that trains himself up to the precise limit of his intended effort is not so complete as he who places his ideal very high and who accomplishes what is set before him by utilizing only a part of the potential energy he feels himself possessed of. To such a teacher the danger of falling into ruts is minimal, for his vision broadens as he advances further and further in his field. Influenced by such a consideration of the work of the teacher, I shall treat the subject under discussion from two points of view: first, how can the teacher prepare himself to carry on this branch of composition work with any measure of success; and, second, how can he best take up the work as a classroom exercise?

It would be, perhaps, trite, yet none the less true, to say that fully three-fourths of the failures registered in teaching are due to the fact that the teacher did not know beforehand exactly what results he wished to attain. It is not necessary that perfection of technique be first secured; some of the most successful directors of music can scarcely play or sing. The art of successfully directing others is completely distinct from the ability to perform. But there never was a successful director who did not know exactly what he wished to achieve, though he might be unable himself to attain to actual performance.

It is not necessary that every teacher of narration in composition be a successful novelist or story-teller. Criticism and appreciation are always easier than originality, and here it is the first named qualities alone that are needed.

Narration has primarily to do with action; it is dynamic and should be ever changing. Hence it is in the drama that we can find the most valuable suggestions in our work. Here as in no other form of literary composition, we see the importance of unity and continuity. Two events stand out prominently, the climax and the catastrophe. The former is the keystone of the play; to it everything that precedes must lead; whatever does not have intimate bearing on the development of the climax is evidence of bad construction. From the climax, all events must radiate through the operation of the natural laws of cause and effect to the final capping event, the catastrophe, where poetic justice is meted out with lavish hand, where intricacies are unraveled and obscurities illuminated. Details may be introduced for variety, for purposes of contrast, but in no case should any detail secure such an important place that the main interest is, even for a moment, drawn from the development of the climax. Yet, on the other hand, the machinery should never obtrude itself upon our notice. The *deus in machina* must be felt but never seen.

The teacher must approach his work with this conception of a narrative clearly defined in his own mind. In this branch of English composition it is to be noted that narration is the form of expression most natural to human beings. It is more elementary to speak of what one has done or has seen others do, than it is to describe what he has seen. Less accuracy of discrimination is necessary for the former operation, and hence children are very likely to excel in narrative though their descriptive work may be almost hopeless. It will not be necessary to drive pupils in this kind of work; if they are only given sufficient confidence by reason of proper training, they will look forward with eagerness to the day on which the narrative is the topic assigned for composition.

How then shall we set about giving this proper training? As in all work analysis must precede synthesis. Logically it may be correct to build up from simple elements, but pedagogically the natural method is analytic. Following the former, we should have to use elements that could be understood only if they were to analyze certain combinations presented to them *en masse*.

Our first work, then, will be to read a short story to the class as a mere relaxation exercise. In my opinion, it is a mistake in the upper grades of the elementary course to demand immediate reproduction of the story. In the lower classes, we may, in fact, *must*, do this, since we cannot exercise discriminating powers not yet developed in the pupils. In the latter case, I should ask for production by one of the "good" scholars, one who can be relied upon.

It is a torture to listen to a good story poorly told, and why should we subject our children to that torture? The teacher may then ask the class in general to supply omitted details. Here, however, many teachers make the mistake of permitting disjointed answers, meaningless in themselves, encouraging habits of carelessness in speech and thought, and in general, deleterious. Whenever a pupil volunteers to supply a missing fact he must be led to show the exact place it occupies in the story and should be encouraged to state why he considers this fact so important as to merit special insertion.

Lastly, comes the teacher with a few well-chosen and direct questions, penetrating right to the core and bringing to the surface new applications and relations. No better training could be furnished in this particular than a careful study of the method of teaching by parables, as found in the New Testament. Blind work here is to be positively condemned. The teacher must know the story perfectly. If, in the first place, as may be desired for purposes of literary appreciation, the story was read, the book should be laid aside during the time devoted to reproduction though it may be referred to in cases of doubt.

The questions of the teacher should be devoted to the following ends:

(1) To bring out facts before unmentioned.

(2) To show the ethical application of the story, if there be any; to ask the opinion of the pupils on such questions of conduct as may lie within their own experience, and, in general, to bring the narrative to their very doors, so to speak.

(3) To show as much of the technical construction of the story as may be thought wise, taking into consideration the age and capabilities of the children. This part of the work will later be treated more in detail.

It will not often be possible to do more than the work outlined above in any one school period. It is, however, to be noted as an indisputable fact that the best results can be attained only when the entire class is required to write out the story from memory. The corrections should be regarding the arrangement and the forms of expression.

In the higher grades, the analysis should immediately follow the general discussion after the story has been told. I have found that the simple question, "What do you think of this story?" is sufficient to evoke varied comment, which aids materially in a proper understanding of the motif of the story.

It may be said that critical work of this character belongs naturally to high schools and should find no place in an elementary course. Were our study detailed the objection would be valid, but it is our purpose merely to emphasize those features which will help us in our work.

Let us take Rip Van Winkle as an illustration of the story read. A 7-B class should have the terms *climax* and *catastrophe* explained to it; in other classes questions should be asked which will bring out facts like the following: What event shows the end of the story? What event occurring in the middle of the story is of much greater importance than any other? In our illustration it will, of course, be Rip's imbibing too freely and his consequent sleep. Are there any events or descriptions before this which will lead you to expect what happens here, or is it improbable? At first the teacher should point out the evidences of unity and continuity, should explain why they are so necessary, and should show the pertinency of apparently disconnected circumstances. In later work this should be done by the pupils with as little aid from the teacher as possible. Destructive criticism, as well as favorable, may here be accepted, for either gives proof of the exercise of discrimination.

When the time for reproduction or for original narration comes, it will be found that most of the errors will fall under two great classes: there will be an exaggeration and overabundance of detail, and there will be a lack of proper emphasis on the climax. These faults can be eradicated only by placing before the pupils examples of good short stories, and here there is no reason why we should restrict ourselves to the ordinary school stories. Poe's "Gold Bug" is every bit as good as Hale's "Man Without a Country." Doyle, Kipling, Weyman, Barrie are all excellent. I have found "The Jungle Book" to be excellent material. Interest surely is never lacking, and if we consider such a selection from the view point of technique, we must acknowledge that never in the history of English literature has the short story been developed to so high a degree of excellence as at the present time.

Short reproductions are to be demanded. Pupils must be led to understand that the suppression of unnecessary detail is an art in itself; but, on the other hand, they must see that certain sequences are vital to the success of the narrative.

Topics for stories are easy to find. I should have the members of the class imagine themselves soldiers at Bunker Hill, Trenton, Yorktown, Lundy's Lane, New Orleans, etc.; farmers awakened by Paul Revere; sailors under Lawrence; members of the Constitutional Convention in 1787; Burgesses listening to Patrick Henry; present on Fulton's first steamboat during her trip up the Hudson, etc. In each case be sure that the pupils see the importance of losing themselves in the place and time of the narrative. I should not show the use of the historical present in elementary grades. Thus we can extend our work, and it may safely be said that no branch of English will be hailed with such delight as the Narrative in Composition.

The Place of Description in the Teaching of English Composition.

By H. V. Abbott, Horace Mann School, New York City.

BEFORE defining the place he will give to description, or indeed to any other matter, in his course of instruction, the teacher of English needs to distinguish clearly between rhetoric, the science, and English composition, the art. It is a difference which cannot be over-emphasized. Everything material or immaterial is, of course, a legitimate *corpus vile* to science. As the scientist may analyze the ink with which an essay has been written, the paper on which it has been printed and the muscles of the hand or the anatomy of the brain which have helped to compose it, so he may, with equal propriety, analyze to the minutest detail the emotions it conveys or the habits of expression, natural and acquired, under which it has taken a coherent and therefore intelligible form. Acquiring this knowledge, however, is very different from acquiring the power to select good letter-paper, write a clear hand, or compose a good essay. The chemist is as likely as another man to use wretched stationery, the anatomist to write an illegible hand, and the rhetorician to express himself in an ineffective style. Indeed with the rhetorician we may go further; his science, unless he can shake off the weight of it, will make him frigid and mechanical.

The teacher of composition has to do not only with one art, that of writing; he has to do with another art, that of teaching some one how to write. And these two arts are appreciably distinct and, to a large degree, practically separable things. It is not of prime importance that such a teacher write well; it is of prime importance that he teach others to write well. For this purpose he needs to acquire—a necessity unfortunate for his own style—a large mass of rhetorical knowledge. With his own common-sense as a solvent he must assimilate as much as possible of the scholastic minutiæ of Bain; get all the "points" he can from the stores gathered by Professor Hill and Professor Genung; find stimulus toward understanding his pupils by studying the psychological investigations of Miss Buck, and put the miscellany of information thus variously acquired into some organic form along the broad lines laid down by Mr. Wendell. These acquisitions, it must always be borne in mind, however, are a means to his teaching, not an end. As for training from experience, the teacher needs to write enough to appreciate that under the clearest instruction there may always be difficulty in writing well; that to every writer the problem of expression prevents individual obstacles which no universal counsels can sweep away, that temperament, the chief essence of style, has its vagaries, and that luck as well as effort enters into every successful achievement. In brief, he needs to write enough to keep human. He needs also to pick up what he can from the confessions of writers of all sorts, preferably writers of average ability, as to their own devices for keeping their thought fluent and their expression well in hand. Dr. Brunton, of London University, is authority for the statement that some writers find chocolate creams an effective stimulus to the flow of thought, that others smoke to good effect when their minds begin to flag, that still others compose best when they can keep their feet slightly higher than their heads. Facts like these—which certainly have their use to the teacher's mind—and the information furnished by formal rhetoric stand upon the same footing. In regard to both, the teacher has but one criterion by which to determine what to tell and what to conceal; he has only one function to perform: he must help his pupils to write.

This has proved a long introduction; its excuse lies in its application to the subject of this paper,—the place of description in the teaching of high-school English, What is that application? First, the teacher must know what description is. This he must know not in order that he may write well; it is not his business to write well; nor that he may transmit his knowledge directly to his pupils; with that knowledge they may have no immediate concern; he needs to know it because under proper circumstances and a little intelligent guidance, it is a natural thing for a writer to seek to be graphic, that is, to describe. The rhetorical spectrum gives four colors to the human mind—the argumentative color, the predominant color of Webster's mind; the expository color, the predominant color of Darwin's mind; the narrative color, the predominant color of the ordinary mind, and the descriptive color, the predominant color of such a mind as Richard Jefferies. The argumentative mind aims primarily to convince; the expository to explain; the narrative to report a trend of events till it reaches a climax, and the descriptive to produce on the reader's mind an harmonious combination of sensuous images. In actual literature, as distinguished from academic exercises, one usually finds these different colors not separate, but in some sort blended. Argument and exposition blend in Macauley's essay on Macchiavelli; argument and narration in Gibbon's "Decline and Fall of the Roman Empire";

position and narration in Green's "History of England," and scription and argument in Lowell's "On a Certain Condescen- n of Foreigners." Of these four colors three may be called of st importance; the fourth, description, is chiefly of value in com- nation with the other three. The man who wishes to enjoy an rmonious combination of sensuous images will usually turn to sic or art; when he turns to his reading he will find that the ief use of description lies in its power to enforce argument and uminate exposition by the use of analogy and specific example d to give reality to narrative by the use of vivid specific descrip- e detail.

And in this recognition of values, the writer is at one with the der. The science of rhetoric must recognize description as a de of expression theoretically separable from the mode of narra- e, of exposition, and of argument. To one in any mood for iting, however, description has no independent standing; it be- gs only to narrative, exposition and argument, and only to those riations, expositions and arguments of which it furnishes an inte- al and inseparable part; it may then be more properly termed idness, not description.

In this respect the ordinary member of the high school has a ander instinct than many modern rhetoricians; he will skip irrel- ant descriptions in his reading and balk at them in his writing, t he will never drop a natural story because it is vivid, an expla- tion of something he is interested in because it makes him see at it explains, or an argument because it brings things home to n; nor will it seem to him unreasonable that he should make his n narratives, expositions and arguments concrete. The problem the teacher is not the thankless one of inducing his pupils to ite formal descriptions; it is the far easier and pleasanter one of lping them in their natural desire to make narrative, exposition d narrative vivid.

Argument, exposition and narrative lend themselves conveni- tly to this assistance. To most minds, however, narrative is the st step in expression, and it is to narrative that strong descriptive lor is most valuable. Let us suppose, then, that the teacher ooses to begin his training in vividness with narrative. After a pil has learned that every story must have a point, and from ginning to end keep to the point, he is ready for this training. get at first a broad idea of the value of such detail, let him sum- arize a story or two to a fifth of its original size, and let him know at his work will be measured by its vividness. Under this prac- e a pupil of ability will learn to make his simplest expressions action specific enough to be vivid; he will learn to use descrip- e verbs. After he has tried this practice enough to catch the good sense of the advice he has been given, he will be prepared to learn the gain in vividness which he may get from adhering to one limited and consistent method of telling a story. For this purpose I take the liberty of repeating what I have already said in the *Teachers' College Record* of Columbia:

"The pupil may wisely be asked to recast and rewrite a story —several of Irving's will be found excellent for the purpose*— according as it would gradually have unfolded itself to the knowledge of a minor or at least secondary character. The character must be one whom the pupils appreciate and in whom they are interested; the part he has played in the original story must be a clearly defined one; his means for seeing the various episodes must have been markedly restricted, and yet, notwithstanding these restricted means, his experience as an observer must suffice for a clear, coherent, and pointed narrative. The practice which comes from the writing of two such themes may be reënforced by oral work in the classroom."

Here he may learn the value of descriptive detail as a means of forcing the reader into a definite point of view. He will then be ready to try a few narratives based or purporting to be based on personal experience. If these are graded exclusively on their power to interest and to impose on the reader's credulity, the pupil will find himself led by the natural force of circumstances into descriptive color. It is surprising to find how much movement and vividness some pupils will put into the simplest experiences, and what skilful descriptive devices they will discover to make pure fiction seem to the teacher an actual experience. Atmosphere may be introduced into the pupil's themes by assigning to him such subjects as "A Capsize" or "Caught in the Rain." Much may be done by the reading of brisk, vivid narratives, such as can be found in Borrow's "Lavangro," Hermann Melville's "Omoo," and Thoreau's "Walden." The pupil who has learned by such methods to make his narratives vivid will learn under a little similar guidance to make his exposition clearer by specific example, analogy and metaphor. In this practice he needs to recognize that the function of a figure of speech is to explain and never to adorn; to make the unknown clear by likening it to the known, the remote clear by likening it to the near at hand, the uninteresting clear by likening it to what is interesting. For this purpose Huxley's figures furnish a sound and stimulating example, and some of Tyndall's are almost as good. What the pupil has learned from narrative or exposition he will not be slow to apply to argument.

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* Especially the "Adventure of my Aunt" in the *Tales of a Traveller*. Here the secondary character is a sneak-thief who hides behind a picture and peeps out through a hole in the canvas.

Descriptive force he will be quick to get just as far as the teacher recognizes that its justification lies in its force and makes that recognition rational to his classes.

In detail, the methods of securing vividness in one's own style or of stimulating it in another's style must change into the temperaments and tastes of the teachers and pupils involved. Those broad, general truths remain, however—that rhetoric is made for style, not style for rhetoric; that academic description is a means to vividness, not an end, and that it is an artificial and indirect means, that the instinct for vivid expression is strong in boys and girls; their use of slang testifies to this, and needs only direction and sympathetis guidance, and that the chief obstacle to vivid writing among pupils lies not in their inappreciation of vividness, but in the failure of the teacher to see vividness as an end and the shortest cut to it.

Argumentation.

By Oswald Schlockow, Instructor, New York City.

SHOULD argumentation find a place in the curriculum of the public school? Do not people argue naturally, and can anything therefore be done to render a child more proficient in the propounding and manipulation of logical arguments? Man is undoubtedly a rational being by racial inheritance; the exigencies of a public school education, moreover, will not allow us to allot time for the analysis of logical propositions, or the presentation of rhetorical embellishments. To this extent no justification could be found for burdening the course of study with this subject. But when we consider that arguments advanced by untrained adults are often vitiated by fallacies which a little reflection could detect, when we bear in mind that a vast majority of our pupils never enter the high school and never learn to distinguish the gold from the dross, can any one deny that we are not in duty bound to guard our youth against the snares which vaporing speculators, unprincipled demagogues, and empty pedants lay for the unwary? That there is need for such guidance must be apparent to all who have heard children argue. Accused of a violation of a class regulation, the culprit is apt to retort, with an air of injured innocence, that some other pupil is guilty of a similar offence. This reasoning if permitted to pass unchallenged may produce a most disastrous state of mind tending towards the conviction that all wrong-doing should be connived at unless every culprit is punished. The ignorant voter who ascribes certain conditions to causes which are powerless to produce the effects in question may in part blame his early training for his deficiencies, for glaring fallacies such as these, can be detected without reference to syllogisms, moods and figures. With this end in view, the following has been written as a suggestion of what might be done in an elementary school, where pupils are too immature to comprehend the subtleties with which our text-books on rhetoric and logic abound.

Nor is the passive side the whole of man's character. We are not merely recipients and digesters of the arguments of others, but we also manifest an active desire to bring our fellow-beings to our own way of thinking. The actualities of life demand this power to convince, and as it is the function of the public school to prepare the individual for his environment, cognizance must be taken of this demand.

The teacher need not begin by assuming that he is called upon to implant a new power. Modern pedagogy has circumscribed the domain of the teacher's activity. Teaching cannot *originate*, but can merely *direct* mental energy. This may be called the law of the conservation of mentality. The teacher should begin by studying the arguments of his pupils and to focus the child's attention on their meaning and validity. Reflection and analysis, the pillars of the Socratic method, are all we need. No argument is too homely to receive attention; in fact, the homelier the better, because the more replete with life and emotional stress. The first step should hence be an analysis of some of the faulty conclusions of children, some of which are herewith presented.

The child in learning about Mohammed calls him a fraud, hypocrite, and impostor. Well and good. Simply ask the excited little arguer to give reasons for such statements, and call attention to the fact that hundreds of millions of little children have sat during the centuries that have elapsed, at the feet of their teachers, and have learned to consider the name of Mohammed as synonymous with holiness, purity, and virtue, and to regard him as the object of the greatest veneration. After some discussion along these lines, some child may see the reason for our harsh criticisms of the prophet in the fact that his views run counter to our preconceived notions, and that our emotional nature is too deeply stirred to permit of calm deliberation. Here we may draw our first inference—that in all arguments we must be very careful not to let our feelings bias our judgment. What a lesson for even an adult to learn! How many tables of weights and measures, how many conjugations and declensions that would be equal to! Now have children give other instances of a similar weakness in our mental constitution—our dislike for the Chinese, for foreigners, etc.

The fallacy of "Arguing in a Circle" is perhaps more frequently met with in a class than one would be apt to suppose, as the following instances, collected in the course of a single day, will show. When asked how he could recognize a co-ordinating conjunction, one boy said that it was a conjunction which connected two equal propositions; on further inquiry as to what equal propositions were, he said they were such as were connected by co-ordinating conjunctions, and this answer appealed to him as perfectly correct. Another boy in his composition stated that in playing checkers the pieces were placed on the principal squares; question elicited the answer that the principal squares were those on which the checkers were placed. To the trained mind such reasoning would seem to border dangerously on the abnormal, but any one who has watched the expression of innocence on the faces of a class when these statements are advanced, will not fail to notice that they are made in perfectly good faith.

It is one of the characteristics of the untrained mind to ascribe effects to wrong causes. Only after the unthinking have been taught to trace and to recognize causal connections can they be made to see the error of their way. The astrologer, the charlatan, the politician, all aim their shafts against this weak spot in the reasoning armor of the unwary. Great prosperity, says A, is due to Mr. X being president; the same cause is ascribed by Z as an explanation for the distress among the people in the West. There may unquestionably be some ground for the argument, but the problem is whether the connection is perceived by the reasoner, or whether two discrete events are thrown together simply because they occurred simultaneously. Careful watching will enable the teacher to detect and to expose this fallacy.

Although we sometimes readily see the weakness and even the worthlessness of our defence, we nevertheless clutch at it with the eagerness of the drowning man seizing his straw. When we are called upon to defend our actions, the first thing we are apt to do is, not to disprove the charge, but to assail our accuser. "I deny the allegation, and I defy the alligator." Children are most prone to avail themselves of every opportunity to prove every one but themselves guilty. A accuses B of cheating; B's first thought is to incriminate A instead of defending himself. The inherent weakness of this argument—ad hominem, as logicians call it—can easily be shown in its true light, and a great many unpleasant moments for both teacher and pupil thereby avoided.

The fallacies thus far pointed out should not be treated at stated times only. Whenever they crop up, be it in geography, history, or grammar, they must be weeded out, otherwise the results of our failure to do so will show themselves when the formal work on argumentation is begun. Moreover, if the pupil can recognize, or better still, avoid the common fallacies, the teacher can direct his entire efforts to the presentation of argumentation as a distinct exercise, laying stress on the analysis, arrangement, and expression of the thoughts, so as to carry the strongest conviction.

THE FORMAL LESSON.

In selecting the question to be discussed, the teacher must exercise due caution to set before his pupils living problems to which vital interest is attached, and on which the pupils have some ideas, though these may be vague. The theme should be expressed in a sentence and each pupil permitted to discuss that side which he believes to be the correct one. To compel a child to defend a po-tion contrary to his convictions is productive of one of two evils: ither the pupil goes at the task without enthusiasm, or, if clever nough to advance plausible reasons, is in danger of becoming hallow, by inferring that any position may be defended, regardless f the personal opinion of the debater. The broader aspect of life, which a pupil in the public schools does not possess, is necessary to orrect the distorted perspective of Sophism, and for this reason no hild should be urged to make what he believes to be the worse ppear the better reason.

After having selected the topic, the teacher should encourage he class to enter into free discussion of the matter under consideration. The arguments advanced should then be tabulated on the blackboard in two columns and finally arranged in logical sequence. Topics might appear in somewhat the following form:

A PROTECTIVE TARIFF FURTHERS THE BEST INTERESTS OF OUR COUNTRY.

Affirmative.	*Negative.*
. Creates market for domestic goods, thereby providing employment for the working classes.	1. American workmen should confine their efforts to industries in which they can excel all other nationalities.
. Creates and fosters new industries.	2. Tariff creates and fosters monopolies.
. Makes foreigners pay the tax.	3. Compels Americans to pay more for goods than otherwise necessary.
. Gives government enormous revenues, which can be expended in public improvements.	4. The surplus revenue may lead to extravagance in the government.

MONEY—A BLESSING OR A CURSE?

A Blessing.	*A Curse.*
Encourages industry.	Causes anxiety and wastefulness.
Provides the necessaries of life.	Promotes selfishness, avarice, distrust.
Enables owner to do good.	Encourages vice, intemperance, etc.

The child should be taught to regard the principles underlying his kind of composition as similar to what he has already learned. All that has been taught about words, phraseology, force, emphasis, etc., all his ability to describe and to narrate, all his store of knowledge must be brought to bear upon the end in view—to convince. To carry conviction is the dominant note on which the effectiveness of the chord depends.

Let the child learn the arguments pro and con of the great problems of the day, which he will soon be called upon to discuss in the great forum of our national existence. The course of events will be profoundly modified, for better or for worse, by the skill which the future citizen will possess in steering clear of the shoals of ignorance, haste and prejudice. Surely there is enough material on hand for discussion to satisfy the most exacting.

1. Is civil service of benefit to a country?
2. Should the illiterate be permitted to vote?
3. Should the negro enjoy equal privileges with the white man?
4. Should monopolies be suppressed?
5. Should United States Senators be elected by popular vote?
6. Should Chinese immigration be discouraged?
7. Is municipal ownership of utilities desirable?
8. Should the State pension aged workingmen?

It will be noticed that no allowance is made in this scheme for problems on conduct, virtue and happiness. It is believed that the pupils of our public schools are not sufficiently developed, mentally, to grasp the underlying principles involved in such problems. If the pleasureable state induced by the educative material is the criterion by which to judge the success of our method, it must be left to the pupil himself to decide which questions he prefers to debate —the living issues of the day or the dry subtleties of the ages that have gone by.

The Writing of Book Notices.

By Franklin T. Baker, Professor of English, Teachers' College, New York.

THE custom of using the literature as a basis for work in composition, written and oral, is now so well established in the elementary schools, and so well justified by results as to need no defense. The literature is, or should be, the richest source from which to draw material for written exercises. But the best ways of using it in training children to write with reasonable clearness, order, and purity are not matters of such uniform agreement. In most schools the reproduction of the story in more or less fulness is a common device: and a very good device, if not made mechanical or careless, and if not overdone. In recent years it has become customary to require pupils in the last two years of the grammar school to write accounts and impressions of what they have read under the general head of "Book Notices." This practice seems general enough to merit a brief discussion.

A "book notice" may be many different kinds of thing. It may range from a brief "I have read it, and like it," or not, to a full and critical analysis. Obviously the first of these extreme types is useless as a training in composition, and the latter, for a child, impossible. What, then, should the teacher expect? What sort of thing should she ask the children to do, and how well should she expect them to do it? Should it be a simple retelling of the story or poem in outline? Should it contain the child's conscious attempt to state whȧt pleases or displeases him? Should it include his reasons for approval or disapproval? Should it add to his faith knowledge of the grounds of his belief? Should it, in brief, be critical,—that is, analytic, comparative, introspective? Should it, on the other hand, be expected to be any fixed sort of quantity; or rather, to be as various in kind and value as are the judgments and tastes in books of adults of the same educational advantages?

The critical type may be dismissed at once as impossible. Children have neither the power of introspection, the skill in analysis, the experience of life, nor the knowledge of literature to justify the teacher in giving the work a distinctly critical turn. Efforts of this sort give only pain to the pupils and a sense of futility to the teacher who knows how to judge the results. Most of the children are either *pen-tied* in the face of such a demand, or write insincere absurdities. Precocious facility in such matters is a thing to be taken anxious note of: it may prefigure a genius or a word-monger.

But the exercise of judgment, it may be urged, is a good thing. Surely. The value of judgment is in nowise to be disparaged, provided it be judgment based on knowledge. Let the enrichment of the memory with the ideas and images of good literature be the *first* care; and let such judgments as the child is impelled to make come of their own accord, and well in the rear of the absorption of the book as a fact. But to make the prime purpose of the book notice a critical review is to invite failure or insincerity.

The reaction from the old-fashioned reliance upon the memory in school work went too far. Distinguished writers on education are now insisting on the value of a well-stored mind, not merely for its necessity in sound judgment, but for its importance in determining the ideals, tastes and motives. It is for this reason that the larger mass of reading now appears in the curriculum. Hence the first thing to emphasize in the preparation of a "book notice" would seem to be a knowledge of the book. If long, the book is seen to be well known by the things the pupil selects; if short, by the satisfactory fulness of his account; if difficult, by his grasp of its ideas. If we are thinking primarily of the training in composition, again the mere acquaintance with the book is seen to be of first importance; for the pupil writes best when he has something definite and familiar to say. While he is writing he has only to organize and express, and not to grope for ideas. A child's report of a book is good enough if it shows that he knows it, and can give this assurance in decently written English.

What it is right and wise to express, however, is not always the limit of what the more capable pupil may be invited and encouraged to try. If he can say what things he likes or dislikes in the book, so much the better. If he can tell why, better still. It is well also if he can see something of the author's method--how a character is made admirable or contemptible; how a scene is made vivid; how action and character determine each other; what the author's main purpose seems to be; how this book resembles in theme or incident or character or method some other book that he has read. Such topics would naturally come into the class-room discussion under a wide-awake teacher, and might easily find their way into a bright pupil's theme. They are essential elements in the appreciative reading of older people, and may appear, though timidly and awkwardly, in the literary judgments of children.

Whatever is written should be clear and orderly. Confusion and rambling are eradicable faults. Children of thirteen or fourteen can be taught to pick out the main ideas of a composition, and to throw the whole into some orderly and systematic form. A little tactful handling will bring pupils to an appreciation of order in their written work.

Perhaps the wisest way to approach the work is to ask the pupils to put themselves in the place of one who wishes to give an intelligible account of the book to some one who has not read it. The reasonableness of the task will thus be established; it will have a motive. Tried by this standard, the various appropriate demands upon the pupil can be made clear to him. "Does your notice give me a clear idea what the book is about? Does it present your ideas in clear and orderly fashion? Is the book interesting? Have you given me any means of judging whether it would be interesting to me? Is it like anything you believe me to have read? What is there in it that is pleasing? What that is useful? What do you consider its best feature?" Suggestive questions could easily be used to make the class read more thoughtfully and write more intelligently of what they read.

I am inclined to consider the term "book notice" an unfortunate one. It is too much bound up in associations with scholarly criticisms and with the paid commendations of new books. Teachers are sometimes inclined to expect literary judgments cast in literary moulds. The results of attempts in this direction are, of course, unfortunate. It is to be hoped that some one of an inventive turn will coin a new phrase for this type of writing that will be at once definite and free from any connotation that can work confusion in the schoolroom.

Composition Based Upon Literary Masterpieces.

By Frederic L. Luqueer, Principal, Brooklyn.

THOUGHT and sympathy, if they have not their source in literature, are by it nourished and made to flow broadly. This, then, is the first point to be emphasized in treating of composition based upon literary masterpieces: the literary masterpiece stores the mind and warms the feeling; it gives worthy subject-matter, it may be a landscape, an historic event, or some winning character. The art of the great writer makes these more than real,—they are the outer reality given us living and human by our Dickens, our Hawthorne, or our Longfellow.

To develop power to appreciate the literary masterpiece is one of the great educational aims. If the flower in the crannied wall leads to infinite questionings and teachings, how much more the great story or poem. In the flower there is something of the silent earth and heavens; in the great book is all this, but made vocal by the fine touches of a musician's fingers upon the heart strings of humanity. Courage, truth, self-sacrfiice are pure gold. They become current coin when stamped by the great historian or poet. We scarce understand our connection with our fellows until we catch the plain reflection of it in some clear-surfaced story.

No child, no man should write unless he have something to say. Bryant tells us that in his ninth year: "I began to make verses, some of which were utter nonsense. My father ridiculed them and endeavored to teach me to write only when I had something to say." This should help to deter us from setting composition topics of which pupils know nothing. Our pupils' home life, their companions, their plays and observations give the first materials for composition; but next to these are the human truths and aspirations embodied in literature in forms that may be as real objects of experience for the child as are the playground and school desk.

In using a literary masterpiece as the basis for composition, the first effort of the teacher must be directed towards having the pupil absorb the letter and spirit of the work. The teacher's own appreciation of the book must be kept real and fresh; and he must so interpret its pages to the children that they take them in,—that they see the seven-gabled house, that they hear the noise of the traffic in the London streets walked by Little Nell, that they hold their breath a moment at the doings of the very strong man Kwasind, that they feel with Evangeline and march with Miles Standish.

For such appreciation the work of writing compositions, based upon the literary masterpiece, is one of the best means that can be used by a skilful teacher. "We learn to think by writing." As the pupils try to express what the author has said, and as they compare their work with his, they begin to share the author's vision. An intimacy of acquaintanceship is born that grows as an offshoot from the author's own spirit, unfolding some of the original powers.

Appreciation will lead to self-educative imitation. Franklin's account is instructive here. When a lad he met with an odd volume of the *Spectator*. "I had never before seen any of them. I bought it, read it over and over, and was much delighted with it. I thought the writing excellent, and wished if possible to imitate it. With that view I took some of the papers, and, making short hints of the sentiments in each sentence, laid them by a few days, and then, without looking at the book, tried to complete the papers again, by expressing each hinted sentiment at length, and as fully as it had been expressed before, in any suitable words that should occur to me. Then I compared my *Spectator* with the original, discovered some of my faults, and corrected them."

There are passages in all the masterpieces used in school that may form the basis for work like this. Such work is valuable as a part of the composition training. A great writer is an artist in words. He chooses them as a jeweler his gems.

But the masterpieces may be used not alone as a model of word employment—of style; it may serve as matter to be retold. How much richer are we in this respect than was Locke, who wrote: "When [the children] can tell Tales pretty well, then it may be the Time to make them write them. The Fables of *Æsop*, the only Book almost that I know fit for Children, may afford them matter for this Exercise of writing English."

These exercises will fix the description or story in mind. They will lead to the appreciation of the author. You cannot tell that your children have understood the book until they have shown you that they are able to recount it. We must remember, however, that a child's power of appreciation is much greater than his power of verbal reproduction. It was only in after years that Longfellow in looking back wrote of his boyhood's liking for a certain book. "Every reader," he writes, "has his first book; I mean to say, one book among all others which in early youth first fascinates his imagination, and at once excites and satisfies the desires of his mind. To me, this first book was the *Sketch-Book* of Washington Irving. I was a schoolboy when it was published, and read each succeeding number with ever increasing wonder and delight, spell-bound by its pleasant humor, its melancholy tenderness, its atmosphere of revery,—nay, even by its gray-brown covers, the shaded letters of its title, and the fair, clear type, which seemed an outward symbol of its style. How many delightful books the same author has given us. . . . Yet still the charm of the *Sketch-Book* remains unbroken; the old fascination remains about it; and whenever I open its pages, I open also that mysterious door which leads back into the haunted chambers of youth."

Appreciation such as this is one of the goals of the composition writing of which we speak. As such appreciation and understanding are developed, another kind of composition based upon the literary masterpiece may be taken up,—the imaginative, creative composition. The incidents of the story, its plot and happenings, its characters may be made so real to the child, that they will serve as points of departure for his own original writing. When the great work is being written, the author is one with his characters. George Eliot felt this. Anthony Trollope bears witness: "At such times I have been able to imbue myself thoroughly with the characters I have had in hand. I have wandered alone among the rocks and woods, crying at their grief, laughing at their absurdities, and thoroughly enjoying their joy. I have been impregnated with my own creations till it has been my only excitement to sit with the pen in my hand, and drive my team before me at as quick a pace as I could make them travel."

In a less degree the appreciative reader, and a child may be such, is one with the actors of the story; and this mutual understanding may be so intimate that it will be easy for the pupil to write compositions into which the characters of the book are projected, conversing, undertaking new journeys, meeting other adventures, discovering new motives, living out their lives. All this will doubtless be crude enough; but the exercise is a valuable one. The child's thought and fancy have been filled with the ideas and forms of the great book. His effort to express these amid new circumstances, or to create something similar, will give him something of the thrill of creative energy. The words will lag; the constructions will be faulty. But will it not be well to have had

"Thoughts hardly to be packed
Into a narrow act,
Fancies that broke through language and escaped."

These, then, are the steps in using a literary masterpiece as basis for composition: First, appreciation is to be gained through the teacher's appreciative reading, questioning and explanation. Second, exercises in reproducing the words and style, the kernel of thought being given. Third, exercises, oral and written, in recounting the description, happening or story. Fourth, imaginative writing, using the masterpiece as model and inspiration.

Composition.

By Elias S. Silberstein, Instructor, New York City.

SOME time ago a young substitute came to me and said: "How would you correct *this* one?"

"This one" was presumably about Germany; at any rate "Jerminy" could just be deciphered at the top of the page. The handwriting was one swift outburst which scorned alignment, and its illegibility would puzzle the brain of the proverbial Philadelphia lawyer; the spelling utterly confounded the recognized authorities on this subject. Like contempt for what had hitherto been considered logical was shown in the construction of the sentences and in the arrangement and general treatment of the subject-matter. I struggled through it and tried hard to decipher its mystic intent—in vain. Instinctively I felt the weakness of all my carefully treasured theories about teaching and correcting composition. I confessed my defeat to myself, and turning tamely to the substitute, I requested that she leave the composition with me.

I kept the paper for a long time, and with its aid learned many things, more, in truth, than I have learned from many books. I subjected it and a great number of similar effusions to analysis; and in the course of time I crystallized the results of my observations into a series of principles which have done me good service ever since. I now present these results, tentatively, knowing them to be the product of a single view point, and feeling that many who will read this article can speak with better grace than I upon this most perplexing subject.

In the analytical way, therefore, in which I have attacked the matter, I have come to the conclusion that a *perfect* composition must be perfect in each and all of the following particulars: (*a*) penmanship, (*b*) spelling, (*c*) punctuation, (*d*) paragraphing, (*e*) sentence construction, (*f*) accuracy, (*g*) treatment; and with this view I have formulated the following principles:

(*a*) In penmanship—*from slow to slower.*

(*b*) In spelling—*from the word of one syllable to the word of four, and back again.*

(*c*) In punctuation—*from the period to the semicolon.*

(*d*) In paragraphing—*many short paragraphs.*

(*e*) In sentence construction—*few words, few mistakes.*

(*f*) In accuracy—*be finite.*

(*g*) In treatment—*from the reproductive to the almost original.*

Let me now defend these maxims.

(*a*) The first of these principles was set forth to counteract the natural and universal tendency to increased rapidity in penmanship as the result of constant writing. Adults, as a rule, write rapidly and carelessly, and children, with the very human proclivity for copying the vices of their elders, would develop an unintelligible scrawl if the tendency were not promptly checked. This rapid writing brings with it a multitude of evils, resulting in careless errors of all kinds. The simplest words are misspelled, punctuation is forgotten, no arrangement of thoughts is attempted, and the finished product is worthless, educationally. After a boy has become sure of the shapes of his letters—that is to say, after he has arrived in the grammar department—this vice begins to take root with him, and the quicker it is weeded out the better. The older the boy the harder the task. If a teacher would only permit a boy to write a composition in his own way, and then to rewrite the same slowly from memory, the beneficent effect upon matters which are not included under penmanship will at once be noted.

(*b*) As to spelling, I must confess that results are a little disheartening. Boys spell the longer words with admirable correctness, but the teacher receives a rude shock if he argues from this, that they must therefore be masters of the shorter words. Again and again and again are blunders made that seem simply inexcusable. The teacher patiently reviews these words; and finally, when he sees that drill has apparently no effect upon the small army of small words in common use, he takes refuge in prayer, fasting and incantation. I once had a boy who spelled the word "grammar" with an *e;* he repeated the offence many times after many corrections. I kept him after school-hours one afternoon, and had him write the word properly a great number of times. A few days later, "grammre" again showed up in one of his papers. *Que faire?*

(*c*) I have taught the marks of punctuation in this order: (1) the period, (2) the question mark, (3) the comma, (4) the quotation-marks, and (5) the semicolon. These are, generally speaking, all the marks that I have permitted boys to use in their written work. If other marks have occurred in reading lessons and elsewhere, they have been passed over with but scant explanation. Punctuation is so dry and technical a subject, and the use of each mark is so enshrouded by circumstance and example, that I have been kept more than busy in explaining the value of even these five. The necessity for punctuation is in itself a consideration so abstract that it takes a maturer mind than that of the average boy to grasp its virtues. Boys in general abhor technicalities of any sort, and will not learn what they do not like. I doubt whether many boys who are graduating this year can use these marks with even approximate correctness.

(*d*) The division of his theme into paragraphs tends to react upon the boy and make him analytical. If the paragraphs are long, he crowds too many heterogeneous thoughts into each. In my experience, a paragraph composed of a maximum of four sentences usually covered the important points of any single topic in a composition.

(*e*) A boy is the natural slave of an illiterate English which he and his companions evolve among themselves, and it takes more time than is allotted to him in the primary school to counteract the false syntax which he acquires in this way. The vice is fought by higher education and mature reading, and he has no time or strength to contend with it properly while very young. In this extremity, brevity is his best refuge, for the shorter the sentence, speaking generally, the fewer the possibilities for mistake. If a boy can fix the logical subject and predicate of every sentence he writes and can arrange simple phrases in logical, unrhetorical order, he is doing as much as the public school teacher can expect.

(*f*) By accuracy, I mean a mathematical adherence to truth, as far as is compatible with the nature of the subject. Each statement should be as unequivocal and as finite as possible. There are more dangers lurking in such expressions as "about," "nearly," etc., "and many other things" than one would suspect at first sight. This scrupulousness compels a careful mental preparation of the subject-matter before pen is put to paper. It furnishes an excuse for precise oral discussion. The teacher should lead any preliminary talk of this kind, and should watch carefully for possible misunderstandings. When a boy, under the heading of "Pompeii," writes: "For two whole days Mount Vesuvius spouted nothing but *lager*"; it is possibly the fault of the teacher, for "lava" is an unusual word, and due emphasis may not have been placed upon its elucidation.

(*g*) A boy "treats" his subject well if he arranges his thoughts in categorical order, gives proper position and due emphasis to that which is most important, and relegates the details to proportionately subordinate places. And herein lies the cause of nine-tenths of the emotions which the teacher suffers in connection with this subject; and the teacher suffers because he expects too much and is uniformly disappointed.

The intelligible portions of the composition on "Jerminy," as nearly as I can remember them, ran about as follows; the reproduction lacks the charm of the author's chirography:

Jerminy.

the poplation of jerminy is about 200,000 squar miles it is the most beautifull river in jerminy it is the Rine first thay send them into there schools and then thay put them into there armeys the pepl ar verry industrus and firtl

the jermin Langage is one of the finst in the wurld it is compost of 26 stats and is a limitd moniky.

The boy's name was signed to this production with a conscious flourish of pride and satisfaction. The talented author was in a 5-B class at the time.

The chief point noticeable about "Jerminy" is that it lacks logical coherence; in spite of his ludicrousness, the boy shows that he is possessed of certain facts, more or less clear, about his subject, but that topical analysis and arrangement are to him arts unheard of. From time to time certain statements about Germany had been made in the classroom, and some of these had remained with him; he set them down at random from his memory, and filled the required space on his composition paper with them. Such considerations as the grouping of kindred thoughts, the sequence of ideas as governed by time and place, or cause and effect, the differentiation of important from unimportant, had no place in his undeveloped brain, and if they were there, the boy was a precocious prodigy, and not the average child of the primary classroom.

At this point the teacher is confronted by his greatest dilemma. The salient features of true composition are its *originality* and *individuality* of treatment. In the fostering of these essentials lies the chief pedagogical value of the subject. If, mindful of this, the teacher simply presents his theme, and says nothing about the handling of it, he may get—he probably will get—"Jerminy" in a more or less marked degree. If, on the other hand, in his desire for logic and correctness, he makes any attempt to map out a course for the boy to follow, he no longer gets composition—the result is essentially *dictation*.

My seventh principle shows which horn of the dilemma I have seized. Can there be composition work in the real meaning of the term, in the lower schools? I really do not think so. Mature ratiocination, independent judgment, bold originality, developed individuality, unaided ability to select, out of a mass of presented facts, what is most suitable and logical at that moment,—surely all these were never the characteristics of the minds of children of ten to fourteen years of age. How many of us possess all these qualities in any marked degree? How many of us can sit down in the midst of the distractions of our own schoolrooms and concentrate, in thirty minutes, within the space of a composition page, in painfully slow penmanship, our ideas on any topic, which we have inflicted upon our own overworked classes,—treating the subject in a new, attractive, orderly way, and being sure not to admit the unnecessary, nor to omit the necessary? Try it.

Two Principles of Mental Development Applied to the Teaching of Language.

y CHARLES J. JUDD, Summer Session, University of Cincinnati. Cincinnati, Ohio.

A GREAT deal has been written on the subject of mental development as exhibited in the production of language by the race and the acquirement of the language by the individual. It is ot the purpose of this paper, however, to attempt to summarize these laborate discussions. Any one who is interested in the whole subect can readily find the material which he wishes in much more apropriate form and compass than would be possible here. The aim of his paper is rather to point out two general principles, which, ecause of their close application to the practical work of teaching anguage, should be constantly held before the mind of the teacher.

The first principle may be briefly formulated as follows: A ord is not in any proper sense a part of the individual's stock of anguage until sound or written word and meaning have been inseprably fused into a single mental state.

The significance of this principle can be illustrated by referring o one's experience in learning any given word. At first one must ay attention to the sound or written form; he must learn the purely ocal art of articulating the word, or the mechanical art of writing t. Attention is concentrated in these first stages on the symbol, ot because of what it means, but because of what it is. Thus, if e choose some unusual zoölogical name as *ornithorhynchus* and resent it even to a trained adult, he must first of all pay attention o the characteristics of the word itself. The word is in no proper ense language at this stage of development. It is not an expression f anything; it is a mere performance.

The difficulty of discovering that the person who is learning he word has not passed beyond this first stage, if that be the case, ies in the fact that the external evidences of language are present o a very large degree in the mere "performance." The parrot, or example, has the performance perfected to a high degree, and here will probably always be a lingering doubt in one's mind as to he validity of the statement that the parrot does not possess lanuage. The same difficulty appears in some of our school work. The external performance may be present without the real incorpoation of the word into the child's language.

Passing beyond the first stage of mere performance, we come o the second stage, which we may call the definition stage of learnng words. Suppose, to continue the example, that I define *orni-*

thorhynchus, according to Webster as a mammal of the shape and size of the otter, with a horny beak, etc. The word has now become something more than a mere performance for its own sake. It has become a first point in a train of association. If I say it or hear it now my mind turns to the definition.

A great many teachers deceive themselves into the belief that this second stage is the true language stage, but it is not. The word which has to call up its definition every time in order to be understood is useful as a means of arousing ideas indirectly, but it is not itself the bearer of the idea to be conveyed. One of the best illustrations of language at this definition stage is the Latin and Greek as most of us used to learn it in college. The words had to be thought out. They were not language to us in any proper sense; they were subjects of thought rather than means of expression.

While we are all willing to acknowledge that our Latin and Greek was left at this undeveloped, immature stage, there will undoubtedly be some hesitation in accepting the next proposition which we are about to lay down. This proposition is that a great majority of the uncommon words of our mother-tongue are held in the minds of even trained adults in the undeveloped, definition stage. And we may add at once the practical application of this discussion to school work by saying that the great majority of "school" words are to the child's mind in the definition stage.

If one will consider carefully some of the characteristics of the definition stage of word development, it will, perhaps, be easier to assent to the propositions just made. Definitions are slow means of interpreting words. If we hear a word that can be understood by its definition only, we either take time to comprehend it or we pass on and lose the meaning. Listen to a technical speech, for example, and you feel the strangeness of it even when the sounds are familiar. You labor along behind the speaker and get only a small part of his meaning. What is true of the adult in such cases is true in a much larger degree of the child. What does it mean to the child to state that the "interior of the earth is in a state of igneous fusion?" As nearly nothing as some profound and technical remark about the construction of a new form of storage battery means to most adults. Even if the children know the definition of "interior," "igneous," etc., the sentence as a whole is not intelligible to them, for the words are not yet real parts of language.

For use as parts of real language, words must be so closely fused with meanings that they do not attract attention to themselves as mere performances, nor indirectly to their definitions, but attract attention directly and without additional effort to the meaning. This final stage of word development can be reached only by patient practice.

One may use an analogy to illustrate this development. The piano-player begins his development by making himself acquainted with printed characters and finger movements. Attention is concentrated at first on the printed characters and a study of their positions, and on finger movements as laborious forms of effort. Later, there is the gradual growth of a connection between the character and its appropriate form of movement. Finally, there comes a stage of development in which the connection between printed character and finger movement is so complete that attention rises above both and is free to concentrate upon the expression which is the end of the whole training.

Teachers would recognize the importance of practice in the case of the piano-player, but overlook the necessity of a similar amount of practice in the art of word-using. There is the external and often misleading evidence of proficiency in language in the mere performance long before the meaning is acquired. There is the possibility of using the word correctly, though laboriously, by means of a knowledge of the definition. And all this is very apt to illude the teacher into the belief that practice is not essential in the development of single words. But practice is essential. Children must read and reread, they must use and use again the words that the teacher would have them completely master. The teacher should come to look upon language as a most complex habit, to be cultivated only by constant practice and to be kept at its highest state of perfection only by constant use and repetition.

We cannot pause for more than this general suggestion in regard to the necessity of much, very much, language work and constant drill in the school, but must pass to the second general principle of mental development, which is of especial importance in the teaching of language. Mental progress becomes more and more difficult as one reaches higher and higher stages. That is, a given amount of effort produces less recognizable advance at a high level of development than at a low level. The result is that progress tends to cease at one of the lower levels unless strong incentives are present for renewed effort toward further development. And it is in the sphere of language that the temptation to stop developing is peculiarly strong, because of the lack of constant natural incentives. The result is that we have a great many cases of arrested development in language which it should be the business of the school to correct.

The meaning of these statements will be clear on a little consideration. Most people give up the study of language just as soon as they have a sufficient command of their mother-tongue to suffice for the common intercourse of everyday life. They find it difficult to read the best literature and so they do not read it. They find it difficult to read even well-written or well-spoken statements on great public issues. The reason for this is in a very large measure the lack of training in the mere vehicle of expression. The effort necessary to understand the words and phrases is too great in later life because it has been neglected in school.

With these illustrations, of the difficulty of receiving meanings through words, are to be coupled the difficulties of expression. The loose, unclear, undignified expression of the ordinary talker is coming to be proverbial. Why is this and how is it to be corrected? It is so because of lack of drill which would make ambiguity more and more impossible. It can be corrected by drill only.

Take, for example, the case of slang. When a new word is coined or a new meaning is given to an old word, we take it up in a loose and often wholly undignified way. Not infrequently the word fills a real need in the language, and it stays. Purists may preach against it as they will in this generation, in the next it will stand in the dictionaries. In other cases, however, the word shows itself, on trial, to be a useless substitute for a word already in existence, and it must go. Such a consideration as the above is most suggestive for the teacher of language. If he finds the child trying to express a thought and doing it clumsily and unclearly, he may preach against the expression as he will. The child will use the bad expression till he finds some other which serves his purpose better. And here is where the teacher should be of use. If the child is left to himself the chances are great that the bad expression will be retained. It serves its purpose more or less fully; why trouble to seek another expression? But if the teacher comes with intelligent criticism, pointing out ambiguity or inelegance, and sometimes suggesting a better phrase, the child will be led to leave the old expression and adopt a new. The process of selection thus carried out is not one of rule of thumb; it is one of language study on the part of both teacher and child, and sometimes the teacher will find, as in the case of slang, that the expression first used is capable of sustaining itself in the face of criticism. The criticism will then have the good effect of making the phrase clear and independent.

The suggestions of this paper may be summed up in two words: repetition and effort. Do not let the mind drop into a state of satisfaction with its own crude expression. Strive always for improvement, whatever heights have been reached. And, secondly, let language work be recognized as work in which there is being built up, slowly and laboriously, a most complex habit. One presentation of a word, once using the word correctly, will never serve as adequate training. There must be constant use, constant drill, constant repetition in the best sense of that term.

Written Composition.*

By Bernard Cronson, Instructor, New York City.

CRITICISM.

T may be set down as an empirical fact that the progress of scholars in the elementary schools is not commensurate with the amount of energy expended by the teacher.

This holds true in all studies, but especially so in the teaching written composition. A year's faithful attention to geography, story, arithmetic or grammar results in a degree of progress in ose subjects disproportionate to the amount of labor bestowed on them. Still, the results are material enough to be recognized en in the poorest scholars.

The same cannot be said of composition, a year's study of which ings very little other recompense than the knowledge that the quirements of the course of study have been complied with and ncrete evidence gathered for the watchful eye of the supervisor. ch results, however valuable they are as a protection for the acher, fall far short of the true aim of this study.

Evidently there is something wrong; and that being granted, e must turn for the discovery of the underlying causes to an alysis of the prevalent method of teaching this subject in our ementary schools.

The initiative is of course taken by the teacher who pours forth fountain of information from a memory well-stocked with facts. hese serve as bone and sinew to the child, who is asked to conruct them into an organism, and to label it "Composition."

The principle of the division of labor, it will be noticed, has us far been carried out with a full appreciation of its equity. The acher did the talking; the pupil did the writing. But when the ird stage of the process—the correction of the compositions by e teacher—has been reached, we are met by doubt and perplexies and consequent divergence of opinions.

Some teachers would insert all corrections fully, leaving nothg for the child but the exercise of recopying; others are as fully nvinced that the mere indication of the mistake will suffice to ach the child the necessary corrections; some people prefer one t of correction marks; others as conscientiously believe that better sults will be obtained by an entirely different set; some would have criticism concern itself with essentials only; others with even the minutest details; some, again, believe it is our duty to jealously guard from outside contamination the picturesque expressions of guileless childhood; while others—but it is impossible and fruitless to recount all the points of differences; for true method is to be found only in the hands of the teacher that employs it, and the number of teachers is legion.

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* By courtesy publishers of "New Education."

It will thus be seen that the teacher is confronted by dilemmas from which escape does not always lead to safety. Fortunately, however, one point is settled for him for good and all, settled beyond the shadow of a doubt, settled so long ago that it would savor of heresy to even question its validity; and that is that it is the duty of each teacher to correct each composition in the class at least once a month.

The last step, the rewriting of the corrected composition, concerns itself with the child alone—the economic principle once more, you see! But aside from this principle, there is another very good reason why the child rather than the teacher, should play the more prominent part in closing the exercise. This is found in the recently discovered principle of correlation, whereby the child, if he fails to gain in mental power through the effort of his teacher, has at least presented to him a condition favorable to the improvement of his penmanship. Otherwise, there is really no justification for imposing this additional task upon the scholar.

The analysis of the method of conducting a lesson in composition is now complete, and a brief résumé will not be out of place:

1.	A talk by the teacher	30	minutes
2.	The same consigned to paper by the pupil......	30	"
3.	Correction by teacher	360	"
4.	A writing lesson by class......................	30	"

Let us pause for a moment and cast a glance at the time-column, always an important item, which has been inadvertently omitted. From it we learn that a composition represents, if we add the time for arranging, fastening, and the preparation of the title-page, an outlay of eight hours' labor, of which, incredible as it may appear, the pupil has actually done one-eighth without assistance from any source whatsoever. And yet his very next composition will contain the identical mistakes which were corrected in its predecessor—the same disregard for punctuation and capitalization, the same misspellings, and the same ungrammatical language, while the disheartened teacher returns to the same routine, the same drudgery, and the same results, though convinced that he had done his full duty as completely as the nurse who complained of her charge's inability to walk, although she had faithfully carried it in ier arms almost since its birth! Absurd? And yet no more so han the belief that pupils will master the art of composition by iaving the teacher do the work for them!

METHOD.

Now for the substitute, which will be discussed under "Choice f Subject," and "Method,"

I. Choice of Subject.

Too great emphasis cannot be laid upon the importance of this reliminary step. The subject, it must be borne in mind, is the naterial in the handling of which the child gets his training; it is he mental food to be assimilated and converted into energy; and he mind, no less than the digestive organ, will reject a certain diet ntirely, will assimilate only a portion of another, and will draw all he nourishment contained in a third. In the physiological world hese differences are accounted for, and practice is made to conform o the lessons learned. In the mental world also these causes have een traced to their source, but, unfortunately, either through arelessness or overzealousness in other directions, it has not re-eived due consideration in practice.

The qualities which a subject for composition must possess may be included under: 1, adaptability; 2, attractiveness.

1. Common sense demands that the subject should be one with which the child is thoroughly familiar. This is absolutely essential. Pedagogy, basing its claim upon the study of the human mind, never fails to sound a note of warning against confronting the child with two difficulties at the same time—advice so frequently repeated that it has become formal and lifeless and is obeyed by but few teachers. It is, nevertheless, wholesome advice; for the attention is no sooner concentrated on one difficulty than its presence is demanded by the other; and as a consequence, it is overtaken by the fate of the donkey that was starved to death by being placed between two bales of hay.

Moreover, language is but the symbolic counterpart of the content of the mind. Hence, knowledge that is vague must of necessity result in expressions that are crude and faulty. On the other hand, clearness of expression—the very foundation-stone of this study—can be attained only through clear and distinct ideas.

2. Steady and satisfactory progress in this subject can be hoped for only when the child is in full sympathy with his subject; for it is only then that his mind is spontaneously awakened to the proper degree of activity.

There was a time when the educational value of a study was measured by the number of obstacles either inherent in the study itself or in the method of presentation; and though modern pedagogy has made a total disavowal of this tendency, and prefers to sugar-coat all knowledge, hoping thereby, as did a certain professional gentleman, to stimulate activity by the administration of large doses of sedatives, yet it cannot be denied that the overcoming of difficulties in certain studies is an important item in the pupil's preparation for life, and in the development of his character. This preparatory stage of composition writing, however, does not belong to this category.

Another tendency may be discussed at this point with advantage: It is that composition is regarded as of value only as a correlative to physics, geology, botany, geography, history and kindred studies; yet of what little importance, comparatively speaking, these are in the subsequent life of the average child, and how vastly more important to him is the command over his mother-tongue!

II. Method.

It has been seen that the main weakness in the teaching of composition is the failure to give the child's activity fuller play; and the remedy which this conclusion naturally suggests will be found recognized in the successive steps, into which the subsequent discussion has been divided.

FIRST STEP.

Aims:

1. To gather material for the composition.
2. To teach the sentence.
3. To clarify and to deepen appreciation through expression.
4. To employ the self-activity of the child.

The subject for composition is announced either immediately before the exercise, or on a previous day, the preference depending upon the grade of class, the character of the pupils, the subject matter, and the principle of variety.

At the appointed time the heading is placed upon the blackboard and the pupils are called upon to volunteer orally any information they may possess concerning it.

No attention is paid as yet to the logical sequence of sentences, the main aim being rather to lead the pupils to give oral expression to their knowledge; but each statement when made is examined by the class for the correction of errors in syntax, after which it is consigned to the blackboard and criticised in spelling, punctuation, and capitalization.

Some difficulty may be encountered during the first few lessons, owing to the disinclination of children to take the initiative; but this will gradually disappear with time. The teacher, however, must remain on the alert during all subsequent lessons; for in each class there are pupils who are ready to shirk work whenever an opportunity like this presents itself. He must bear in mind that the efficacy of the exercise depends largely upon the relative number of pupils in the class who take an active part in the lesson. Passive members need to be convinced of their responsibility if the lesson is not to degenerate into an exercise by the few for the few.

The teacher has still another task: When as much information and from as many pupils as possible has been gathered, his superior knowledge and judgment must decide upon the adequacy of the information—whether the facts as presented do not call for broader or fuller treatment, or whether certain essential points have not been entirely omitted. Here he must assume guidance, and by skilful questioning lead to more satisfactory results.

SECOND STEP.

Aims:

1. To teach the paragraph.
2. To train the judgment and reason.
3. To employ the self-activity of the child.

The blackboard, it is presumed, contains all necessary information, the statements following the order in which they were made. Reference must now be had to it for a classification of the material.

The child is already acquainted with the paragraph. Long before he enters upon formal composition, he has had his attention called to the division of his reading matter into groups. He has also, or should have, some faint idea why this is done. This knowledge, learned inductively, he is now called upon to apply to the solution of the following questions:

1. What statements show a natural relationship?
2. Of what particular phase of the subject does each group of statements treat?

The answer to the first will give the group to which each statement is to be assigned; the answer to the second will give the proper headings for the topics.

It must be confessed that the task with which the child is confronted in this and the subsequent stage is by no means a simple one, calling as it does for the exercise of his judgment and reason in no small degree. The teacher also will find his patience taxed, and will be sorely tempted to conduct these portions of the exercise along the lines which call for the least expenditure of energy on his part and that of his pupils. It is so much easier to impart information than to arouse the higher activities of the child's mind. Besides it requires less time!

Such considerations, however, are alien to the spirit of the true teacher, whose only aim is to do his full duty to the child. This he can accomplish only by calling upon the child to do his full duty to himself by exercising his own powers.

But any activity tends to the formation of a habit by frequent repetitions. When the mind has once passed through a certain channel of thought, its subsequent passage will be accelerated by its previous experience; and the more frequently the same mental process occurs, the readier does it respond to its appropriate stimuli. Hence the difficulties that may be ascribed on the supposition of a first presentation of this method will grow less and less. Thus, if a sufficient amount of practice has been had, the statements will no longer be made without any regard to system, but some will spring up in their logical order of their own accord, while the rest will be made to conform to rules through conscious effort before utterance is given to them. Training of the power to perceive relationship tends more and more to its assumption of the character of an instinct,

THIRD STEP.

Aims:

1. To train the judgment and reason.
2. To teach logical sequence.
3. To employ the activity of the child.

This consists in applying the self-activity of the child to the discovery of the logical sequence of paragraphs and of their elements. The method and the mental processes employed here differ in nowise from those of the previous stage, the only distinction being the choice of a different standard.

FOURTH STEP.

Aims:

1. To develop independence and variety of expression.
2. To show the power and the beauty of the language.
3. To employ the self-activity of the child.

The sentence has been treated in reference to its syntax, classification, and sequence. There is still another phase of it which demands attention in virtue of what may be termed its æsthetic side.

A sentence, as an expression of thought, is not invariable. On the contary, such is the genius of our language that a thought may be expressed in various ways, each differing in the qualities which make up its style. This, however, is merely incidentally taught, the chief aim being to develop independence and variety of expression.

The class is called upon to take each of the statements upon the blackboard and restate them in various ways. The several expressions of the same thought are then compared, individual preferences are called for and reasons assigned for such preferences.

FIFTH STEP.

Aims:

1. To teach composition writing from topics.
2. To unify and to apply the knowledge gained.
3. To train the reproductive faculties.
4. To employ the self-activity of the child.

Everything is erased from the blackboards, leaving only the headings for the topics to serve as guide posts, and the pupils are told to write their compositions.

SIXTH STEP.

Aims:

1. To awaken the critical faculty.
2. To teach the child self-reliance.
3. To train his judgment.
4. To employ his self-activity.

One or two of the written compositions are copied daily upon the blackboard for friendly criticism. The pupil at the blackboard reads a whole paragraph, then waits for suggestions which, when approved by the teacher, he incorporates as part of his composition. All corrections are made in full and not merely indicated.

When each paragraph has been treated in the same way, not forgetting to lay stress upon such simple rules of rhetoric as length of sentences, connectives, and the mode of transition from sentence to sentence, and from paragraph to paragraph, the pupil transfers the corrections to his written composition, and then returns it to his teacher.

SEVENTH STEP.

Aims:

1. To develop the sense of beauty.
2. To train in careful perception.
3. To employ the activity of the child.

All compositions are rewritten by the pupils, each taking care not merely to note all corrections, but to write as neatly as possible.

Throughout the child has thus been called upon to put forth his best efforts; and when completed his product is again returned to the teacher, who retains it for future comparison.

The advantage claimed for this method is that it calls into activity the child's efforts at every stage, while it in no wise lessens the responsibility of the teacher. Instead of narrowing the child to a reproduction and to a recopying, his field of mental activity is widened immensely; and while there is a greater call upon the teacher's energies, he is at the same time relieved of the drudgery of correcting compositions outside of school hours.

Another and very important point in its favor is that the underlying incentive to all work—interest—is by this method awakened to the highest degree.

SUGGESTIONS.

The foregoing is intended as a general method for conducting an exercise in written composition; but, like all generalities, it must be modified to suit particular applications. What these modifications should be, must be left to the judgment of the teacher. A few suggestions, however, can be ventured.

1. As many of the steps are to be included in one lesson as can be covered in the time allowed by the order of exercise. This may mean several topics, or only one. In either case, the quality of the work—rather than the quantity—should be the criterion.

2. The pupils should be given the opportunity to exercise independent judgment, not merely in their choice of language, but in the sequence of sentences and paragraphs, the only limitation being the demand for valid reasons.

3. The fourth step may be omitted entirely, especially in the lower grades, and in the higher grades also, if it is found to induce sameness of expression. As a general rule, whenever memory usurps the province of judgment and reason and the mental efforts incident to their expression, the exercise loses its value and should be promptly discontinued.

4. The first three stages are the most important, and any curtailment of the exercise should not affect them.

5. Compositions are to be written upon the blackboard, either before or after the regular school session. To do otherwise would result either in a period of idleness for the rest of the class, or if they are engaged upon some other lesson, the writing will act as a counter attraction, and will withdraw their attention from their study.

6. If there is sufficient blackboard space, the work in the first four stages may be allowed to remain for a final lesson on the evolution and sequence of the lesson, before proceeding with the succeeding stage.

7. A list of the most common errors made by the class should be kept and referred to occasionally.

8. Between ten and fifteen compositions of each set should be corrected on the blackboard; the rest should be corrected by the pupils themselves. On rare occasions it may be advisable to exchange papers for criticism, but only in the higher grades. The teacher also may correct a few papers, but only after the pupils have had the opportunity to criticise them.

9. When in the judgment of the teacher the ability of the children will warrant it, the first three or four stages may be assigned as a home lesson.

New York Teachers' Monographs.

PRINCIPLES OF EDUCATION

OCTOBER, 1901

The Fundamentals of Educational Theory.

By Nicholas Murray Butler, Professor of Philosophy and Education, Columbia University.

THE modern study of education, in a philosophical spirit and by scientific methods, is one of the most fascinating, and at the same time one of the most practical, of studies. It is fascinating because it lays under tribute the world's art, science and philosophy, and invites the student to new syntheses and interpretations. It is practical because it relates itself at every point to life, life individual and life social. The conclusions are tested as rapidly as made, and the nations of the world are one vast laboratory for its researches and applications.

It is my present purpose to point out, with necessary brevity and succinctness, the fundamental doctrines of the modern study of education.

The older conceptions of education, based upon misleading etymologies and dogmatic prepossessions, are fast yielding to a view of education which makes it a part, and a necessary part, of the life history of the human race. Education existed long before there were schools—indeed, long before instruction was in any degree systematized. To attempt to form an adequate conception of education from a study of the school and its problems, or from an analysis and interpretation of formal instruction, is to put the cart before the horse. Both the school and instruction get all the significance they have from education, which includes them both and much more besides.

To grasp the meaning of education in all its fullness we must go back to the doctrine of evolution. This doctrine, that the phenomena of the universe unfold themselves systematically in accordance with ascertainable laws, shapes all our thought and goes with more or less completeness into every nook and cranny of our intellectual life. An instinctive belief in this doctrine, yet unformulated, led to the rise of philosophy and of science and sharply separated both from the older mythologies. It inspired the thought of Plato and guided that of Aristotle. It led Kant to sketch out the gigantic theory of cosmic evolution, Hegel to trace the life of spirit in his monumental *Logik*, and Herbert Spencer to endeavor to put together a consistent account of the phenomena of human experience.

The essentials of an evolutionary process are thing and environment, other things, interacting. Without going too far afield into pure philosophy, it may be pointed out that the distinction between one thing and other—other-ness, as it is called—can only arise in consciousness, and in self-consciousness at that. The beginning of all distinctions and the type of them all is the distinction that self-consciousness makes between the self which is subject and the self which is at the same time object of thought or consciousness. This is one of the many reasons why the universe is a creation of spirit and is obedient to the laws of spirit.

In human evolution the thing is the individual human being and the environment, the other things, is the sum total of all the other beings and influences in the universe that play upon the individual and are in turn played upon by him. It is obvious that this interplay of human being and environment begins before birth and goes on until the moment of death; what happens after that we cannot tell. Yet this interplay is most formative of the human being during the earlier years of life, because plasticity, capacity to be moulded or influenced, is greatest during periods of growth; and human growth, both quantitative and qualitative, is substantially completed by the twenty-fifth year. It is the study of this interplay of human being and environment during the first twenty or twenty-five years of life that gives us a clue to the true meaning of education.

We cannot help noticing, as we observe this period, the marked differences between the behavior of the human being and the lower animals. Very many of the latter are born into the world in the full possession of all their faculties, so to speak. They are able to perform all the acts that are possible for their elders in the same family or animal class. Their life is already organized, at birth, into instincts, and they have nothing to learn. Life for them is full from the very beginning and it grows no fuller as it proceeds. Successive generations of these animals follow each other, so far as we can see, in a monotonous round of instinctive acts. They make no history, and the only change they exhibit is due to the slow-moving cycles of influence from without. In other words, these animals have no period of infancy, of dependence on their elders, of learning, of education.

Infancy is essential to education, and considered in the light of the doctrine of evolution, the meaning of education is most clearly seen in the light of the meaning of infancy. The existence of a period of infancy in an animal or human being implies that there lies before such animal or human being a series of potentialities for which he is not prepared at birth. This pre-natal existence has not been sufficient to equip him for his complete life; he is born with only a partial and incomplete adjustment to his environment. Life for him is a vast unexplored and unsurveyed region of which he gains knowledge and in which he develops efficiency slowly and little by little. He is not truly himself until he stands erect, so to speak, in his environment and grasps its significance. Infancy, in the sense in which I use the term, gives him a chance to prepare for this. Physically, infancy is a period of some seven years; legally it is a period of from eighteen to twenty-one years; philosophically, it is the period, now nearly thirty years in length, during which the elders plan to train the young human being for efficient participation in the life of the community. Education is the name which we give to the more or less systematic and formal influences at work during this period of infancy, whose purpose it is to make actual and real the potentialities that are at first dormant and to develop the individual for independent and reflective life.

In this way education finds a place in the scheme of things. It is related to the doctrine of evolution through infancy, which is a necessary phase of evolution.* It is no longer a haphazard or a merely individual matter, but an integral part of man's deepest insights into the cosmos of which he is a part. This conception of education seems to me to be perfectly adequate, for it is not dependent upon changing subject-matter or merely national ideals or shifting psychologies. These are all ripples on the surface of a philosophical conception of education.

As a result of the foregoing analysis, there loom up large two factors in education—the human being during the dependent or infant period and the environment which is his normal field of activity. Each of these claims a large share of attention in the study of education.

The first of the two factors, the human being, demands study from three points of view—the physical and physiological, the psychological, and the social. For a decade or more studies of the human being from one or more of these points of view have multiplied rapidly, and the literature of the subject is now extensive. The purpose of these studies is to gain an accurate knowledge of the real, as distinguished from the hypothetical, child. The laws of his physical growth, the relations between growth and liability to disease, and the conditions and symptoms of fatigue are some of the subjects that confront the student at once when he approaches the child on the physical or physiological side.

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* For an exposition of this point, see the writer's *Meaning of Education*, pp. 5-16. New York: The Macmillan Co., 1898.

Similarly, on the psychological side, we study the child in his mental unfolding. Few processes pass into many, simple ones into complex, potentialities become actual, and mature mind begins to appear and to establish itself. Learning is an instinctive act; conscious teaching is a highly organized and artificial process. Therefore, the procedure in teaching must be adapted to the laws of learning. This is the practical point of contact between education and psychology. Most problems arising in the field of formal instruction are problems in the application of psychological knowledge.

The social aspect of the child's existence is not a whit less important than the physical and the psychological. Aristotle's dictum that man is by nature a political animal means, rightly interpreted, that human nature is not complete in isolated individuals, but only in individuals whose individuality is developed and enriched by relationships with others—relationships in the family, in civil society, and in the organized state. Here is found the basis of all moral education and the eternal refutation of all anarchism and lawless self-seeking.

Then from the individual child we turn to the environment, the grand tale of the civilization which surrounds him. This I have called the child's legitimate inheritance,[*] into the full enjoyment of which he ought to be trained to enter. It is perfectly possible, and entirely reasonable, to analyze this environment in different ways and by different methods, but my own preference is for the analysis which follows:

Environment:
- A. Physical.
- B. Spiritual:
  - 1. Science.
  - 2. Letters.
  - 3. Art.
  - 4. Institutional life.
  - 5. Religion.

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[*] See the writer's *Meaning of Education*, pp. 15–31. New York: The Macmillan Co., 1898.

Education, then, as a concrete matter, becomes the shaping and guiding the development of the child towards adaptation to and appreciation of his many-sided environment. But it is not passive adaptation only: it is an adaptation which includes the development of efficiency, or actual capacity to mold and shape the environment rather than be hedged in and crushed by it—capacity to move forward, in other words; and an adaptation which includes the growth of that subtle power in the individual himself which is character. If we give the name culture to a rich and rounded knowledge and appreciation of the five-fold spiritual environment, then the aim of education is, always protecting Health, Culture, Efficiency and Power.

It is obvious at a glance that in such a view of education as this intelligence, knowledge, is not a dominating purpose or influence, but that it is always subordinate to action, conduct, character. Philosophy and psychology alike support this view. All that we know and see is manifestation of energy, activity, and these manifestations lead back to an ultimate self-active principle. This principle works itself out in the individual life and on the great stage of the world's history. On this stage we may see enacted, in the large, the dramas of feeling, of conflict and of yearning that, in a small way, enter into our own single lives. In history, especially in the philosophy of history, is guidance for educational theory to be best sought.

Every earnest teacher should prepare himself to read and to understand the philosophy of history, there to find the clue to the great problems of life and of mind. My advice to the student is to master the thought of Dr. Harris's truly great book on "The Psychologic Foundations of Education" (New York: D. Appleton & Co., 1898), and then to pass out through the door that it opens to the continual study of human civilization in its manifold forms of revelation and expression.

Aspects of the Doctrine of Self-Activity.

By Walter L. Hervey, Board of Examiners, New York City.

OF all the conceptions that give aid and comfort to the teacher, that of self-activity is one of the most inspiring and fruitful. The notion is a fundamental one in philosophy and psychology, and it is therefore basal in education. This fact was never more clearly recognized than it is to-day. In modern works on philosophy we meet again and again such expressions as these: "Primal being can be conceived only as self-activity;" "The soul is a self-activity." Modern psychology regards "will as the primary and constitutive function of mind," and makes intelligence a secondary evolution, grafted as it were upon the will, to the end that it may discover ways and means to the end at which the will aims.* "Man," says James, "whatever else he may be, is primarily a practical being."† Modern educational theory is in accord with these ideas. It makes activity not only the end of learning, but the means of learning. It states the aim of education in ethical and sociological terms; and says, as regards its process, "We learn by doing." This means that the chief end of man is not merely to know, but to act; to act sometimes, and, wherever possible, in the light of prior knowledge; sometimes, if necessary, in the dark, that light may come through acting. The meaning of this, is not, I confidently believe, grasped by any of us with sufficient clearness, or pondered with sufficient intensity, or applied with sufficient faith in its soundness and its efficacy.

Self-activity is difficult to define. We know, as well perhaps as need be, what activity is, and we should know what is meant by the term self. Self-activity is activity which sustains some relation or other to the self: what precisely this relation is is the question we have to answer.

Self-activity is, first of all, activity that springs out of self. Impulse and activity do not come from any source outside of the self. The self is not the product of the environment. The tendency to act is the primal fact of being. If you ask: "Whence does it come?" or "Why do seeds, dogs and children tend to put forth energy, to do what they can do, to assert themselves?" the only reply is: "You have asked the unanswerable question, 'Why being should be active is a question that transcends all answer.'"* Here, then, we seem to have reached the ultimate and original point in human nature—the point back of which we cannot go and from which all else proceeds. Again, it is clear that activity that springs primarily from out the self is both self-determined—taking orders from nothing without the self—and self-expressive—a true forthputting of the self, and not a mere reflex of the environment. And it is equally clear that self-activity is not selfish activity, for selfishness in all its forms is essentially self-destructive, and that we can safely assert the primal principle in the universe is not. And, if not negative, then positive. Hence self-activity is necessarily self-constructive, self-realizing, self-creative; or, what means the same thing, it is world-creative—for self-active mind in the process of making itself actual by expressing itself, creates the macrocosm of arts, sciences, literatures, institutions.† This means that self-activity is essentially social activity; not private activity by and for one's private self—if such a thing is possible—but public activity—activity which works with and for one's fellow-men.

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* Paulsen. Introduction to Philosophy, p. 113, f.

† Talks to Teachers, p. 25.

Summing up we may say: Self-activity is activity "that contains its primal impulse within itself;" it is activity that is self-conscious, self asserting, self-determined, self-expressing, and in the largest sense self realizing. Self-activity is thus another name for the activity of spirit; and the problem of self-activity is seen to be one phase of the problem of spirit: how to maintain the primacy of spirit: how to nourish and promote the life of spirit.

How, then, can we keep spirit uppermost—"keep my soul on top," as the little boy put it, interpreting the Pauline words, "keep my body under"?

Let me say, by way of preface, that mechanical explanations in psychology explanations in which the impression is almost irresistibly conveyed that the spirit is somehow less real than matter, need to be supplemented by conceptions that assign to spirit the same reality as is conceded to matter and mechanism. It is true and necessary to describe a fit of passion in physiological terms; it is equally true, and I believe necessary, to speak of it in terms of spirit. An illustration of what I mean is found in a notable passage in Paulsen's "Introduction to Philosophy" (p. 188), where he quotes Fechner approvingly, to the effect that the existence of a cock's spur, plume and comb is not to be explained by Darwinian natural selection, but that we may believe "that . . . the psychical impulse . . . was able to bring out the parts." The cock has his spurs because he wants to fight. Spirit is a real entity and a true source of energy. This energy we cannot create, though, unhappily, we can and do obstruct it. Nor is it transferable. No mind can *directly* help or teach another mind or cause another mind to learn or to do anything. Each individual spirit is forever itself and no other, and each must act for itself.

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* Ormond. Basal Concepts in Philosophy.

† Harris. Psychologic Foundations of Education.

Spirit asserts itself: self-activity is self-assertion. If the child were all alone in an empty world, there would be no question of primacy, or, indeed, of anything else. It is the persons and the things around him that make his problem. They hem him in, oppose him, thwart him, threaten to overwhelm him. He is weak, they are strong. He is one, they are many. What can he do? He tries to hold his own. It often seems a choice between being a slave and of being a despot. Some children become one, some the other. In every child there is the impulse to make a stand in the last ditch, to defend his *allod*, to assert himself, waving the flag of his personality in defiance of the whole world; and, if forced to surrender, to do so formally, planting the flag in his heart. "I'm thinking it!" said a three-year-old, in reply to her father's command, "Don't let me hear you say that again." The first step the parent or teacher can take towards avoiding this defiance or this insincerity is to follow the dictum: "It is the first duty of every will to respect every other will." The rest of the process has been called "the saturating of will with reason."

A further assertion of personality, and a higher form of self-activity, is seen in the impulse to do tasks unaided, unwatched. A little child not three years old will reject the proffered hand of its mother, saying, "I can do it alone," "Self can shut door," "Let it lie, I can jump over it." "I can climb up alone." "Self will play in sand pile alone, Mama, shut door. . . . Mama, shut door on *inside*," said a child aged 30 months. The mother, thus banished, weeps because she has lost her baby. The person out in the sand pile is in business for herself—no longer a branch establishment. A child of three, when flourishing a hand mirror, is told by her auntie, "Give it to me, please, I'll put it up." "Put it up self, bye and bye." Whereupon the wise auntie turns her back to the child. Instantly the mirror is replaced. It would have diminished the absolute self-determination of the deed had it been done under the eye of the waiting auntie. Here was the impulse and the determination not to do the thing because commanded by another or under another's oversight or superintendence, but to do it because, though suggested by another, it was commanded and chosen and supervised by *self*. Any adult who has been sick knows the delight of raising his head or walking a step without the aid of his nurse. A normal child is continually in a state corresponding in this respect to convalescence.

If, however, the task is too hard, the eagerness gives way to discouragement; if too easy, zest is changed to ennui; either is fatal to self-activity.

The maxim, "Never do for a child what he can economically do for himself," is often unwisely interpreted to mean: Allow the child to cope with difficulties alone, no matter at what sacrifice of time, strength, courage and opportunity for independent work on a higher plane. The child who is given needed help in the rudiments may soon be solving independently problems he never would have reached without such aid. When to tell outright, and when to throw back on one's own resources, is a problem that can only be solved wisely by the teacher who sees the end—both of the child and of the subject—from the beginning, and who knows how to detect signs of submerged self-activity.

The self must be asserted and its autonomy maintained in the presence of things as well as of persons. There is much to be said in favor of allowing a child to go his own gait, to do things in his own time and in his own way. There exists no more insidious way of sapping self-activity than this: from infancy to adult years to live in slavish fear of calendars and clocks and cars. To run for a car is not the act of a free man. To rush an article through, "devil" at elbow, is not conducive to the free forth-putting of spirit. I am not blaming calendars or editors, and I do not propose to join a revolt against them. But I have much sympathy with any man who declares that he will never again engage to do a specified work by a specified time; that when the spirit moves him to do the work he will do it, and that when it is done he will engage to deliver it by a certain date, knowing that he can do what he has promised without the humiliation of hurry. Each spirit has its own rhythm and tempo. It is the impulse of every man to find that rhythm and tempo, and to maintain them, I had almost said, as he would guard his honor. But this impulse is often stifled. It is the business of every teacher to respect this impulse in the child. I do not of course mean that the teacher should encourage the child impotently to accept inborn or acquired limitations, or that clocks and cars may not and should not be made allies through foresight and self-direction. I am writing for the elect, for they alone can understand how spirit can master mechanism while obeying it.

This problem of subordinating mechanism to spirit is one which recurs in every school exercise and is present in every deed of life. The two are not essentially at variance. Spirit must use mechanism in working out its own purposes. The absolute helplessness of a mind without habit is proof of this.

Whenever, in this conflict between the self and the rest of the universe, other wills, or mere things, get the upper hand, the result is activity that is spiritless, merely mechanical, slavish,—the reverse of self-activity. An amusing instance of failure to discriminate between self-activity and muscular activity came to my notice some time ago in one of the schools of a distant city. On the entrance of a visitor two children were called to the front of the room. One was given a bunch of keys. "Johnnie," said the teacher, "you may shake the keys." Johnnie shook them, somewhat sheepishly. "Now, Jamie, you may tell what Johnnie did." "He shuck the keys (spoken perfunctorily). There followed a similar performance with a doll's carriage. "You see," said the teacher, "we learn by doing." But to the visitor it was apparent that neither John nor James had done a thing. The "primal impulse" had not come from the children, but from the teacher. In every school-room where an executive and masterful teacher is "the whole thing," there is a similar lack of self-activity. In the nature of things self-activity can never be identified with any spiritless or slavish act. From all lip-service, eye-service and time-service it is absent, neither can it exist in the presence of absolute dictation. In every task, no matter what it is or who is doing it, there should be left room for the self to say, "This is my work."

A slave is "one who in his actions does not express his own ideas but those of some other man."* Slavery is not an external condition of bondage, it is an inner state of mind. No one can blindly, unsympathetically or mechanically follow the plan of another without, to a certain extent, being a slave. This is proved in the training and supervision of teachers as clearly as in the teaching of children. A supervisor must indeed plan for the teacher, but before the teacher can self-actively carry out that plan he must have made it his own. What supervisors owe the teachers is, first of all, spirit, ideals; then suggestions of ways and means which may be freely adopted according to need. Thus alone can the self-activity of the teacher be developed. And the fostering of self-activity in the teachers is a necessary condition of developing it in children.

When spirit and mechanism are perfectly adjusted so that mind can freely work upon matter, there results the highest self-expression and the completest self-realization. For the self can express itself only through the medium of matter, and it can realize itself only by exercising creative activity upon its material and spiritual environment. I do not know myself until I have spoken words, performed deeds, created something in my own image. I do not even exist unless I express myself, and in proportion to the completeness and sincerity of that expression is the fulness and truth of my life. It is indeed true that a man is greater than anything he can do; that

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* See Dewey, School and Society, p. 33.

"All I could never be,
All, men ignored in me,
This, I was worth to God."

Yet this only brings out in stronger relief the truth of the saying: It is the duty of the teacher to give the child every possible opportunity and incentive for expressing himself—in language, in gesture, in vocal music; in various forms of play; in constructive activity with pencil, brush, tools, or the hand; in the rudiments of all kinds of work, and in the higher reaches of some special work well suited to his powers, which he may call peculiarly his own.

There was a time when the avenues of self-expression in school were few and narrow. I believe it is fair to say that the result of this has been lives in many cases so cramped and driven in upon themselves that they do not know how cramped and suppressed they are. In recent years new avenues of expression have opened. No one who has ever observed, as many of us have had the privilege of doing, children who, day after day, have been given abundant opportunities to express themselves, can doubt the profound significance of the change. The child who learns at school to draw, to model, to paint, to sew, to cook, to make things in wood and iron, to sing, to speak and write effectively, to carry himself in a way that expresses his character, finds within himself a fund of resourcefulness, a degree of self-poise and efficiency, and a capacity for enjoying life, which passes the understanding of those who have not had such advantages. There are, as every one knows, schemes and curricula which make such activities the staples and not the mere "frills" of school life. The best account of the theory and practice of one of these schemes is found in Prof. John Dewey's "School and Society,"* a book which I earnestly commend to the careful study of every teacher. It would not be wise for every school, or, as I believe, for any public school, to try such an experiment. But it is none the less desirable for us all to gain from a work that has a great idea behind it, as that work surely has, whatever impulse and suggestion it can yield of direct and practical value for work carried on under widely different conditions.

It would of course be a grave error to suppose that the exercise of creative activity is limited to those subjects which call for the immediate making of an external product. There is an element of such activity possible in every educative exercise, just as the lack of it is apparent in an ill conducted class in manual training. The aim of the teacher should be to evoke the highest possible degree of self-activity in every exercise, whether in the form of active participation, of questioning, of planning, of problem-making, of initiative. All means to this end have this in common: they identify the subject to be studied with the pupil's self, that is, with problems, plans and interests which have become a part of himself, the attainment of which is necessary to his self-realization.*

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* University of Chicago Press.

We have seen that the crudest form of self-activity is self-assertion, that its process is self-expression, and that its end is self-realization. But it must never be forgotten that the word "self" in all these uses is not to be identified with that which is selfish, but that it is always essentially social. No one can exhibit or attain the highest self-activity who has not learned the truth of the paradox: "He that findeth his life shall lose it; and he that loseth his life for my sake shall find it." Thus self-activity which begins in self-assertion ends in self-renunciation. It begins in impulse and ends in insight. It begins as an individual self, but in the end realizes the ideal that "in each human being there lies and lives humanity as a whole." This is the meaning of Froebel's conception of the Gliedganzes,—the conception of man as a being who is at the same time a whole and a part. This insight, which is the corner-stone of Froebel's system, and which is the high-water mark of his thinking, is one which deserves profound study and faithful application. And this leads me to say, in conclusion, that there is a book bearing on the subject of this paper which I earnestly commend to all teachers for their sympathetic and careful study. It is Froebel's "Education of Man," of which President G. Stanley Hall has said that it is on the whole the best philosophy of education that we have, advising that it be read at least once a year. For myself I can testify that I have had the privilege of studying it with many classes, always with profit and with keen enjoyment. There is much in the book to omit, there is much in it to criticize, and there is much in it that will inevitably repel many minds. The book is a mine, not a retail shop, and yields its best returns by being worked. Those who dwell upon its essential features, and return to it again and again for insight and inspiration, will find it increasingly helpful.

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* The best treatment of this aspect of self-activity is found in Dewey's *Interest as Related to Will*, Second Supplement to the Herbart Year-Book for 1895, Chicago.

The Process of Attention.

By Robert MacDougall, Professor of Psychology, New York University.

I.

IN any discussion of attention one labors under the initial difficulty that it has to do, not with a special group of facts, but with one whole aspect of the conscious life. To attend to a thing is to be aware of it, and the more vividly one is aware of that particular thing the more it is attended to. One may dislike or reprobate the object, and desire with all one's heart to flee from its presence; but so long as it cannot be escaped from, outwardly or inwardly, by absence of body or absence of mind, the domination of consciousness by the hateful object must be called a state of attention to that thing. The derivation and practical connections of the state matter not, nor the ease or difficulty with which it is maintained, nor even the emotional attitude which accompanies it; wherever there is conscious awareness of an object, there is what we mean by attention.

The term is an expression for the relation of consciousness at any given moment to the actual and possible objects of experience. Out of the whole range of impressions and ideas which have been received in the past, only those which are in consciousness at the moment in question are objects of attention; those which are not present or remembered are unattended to. One cannot be said to *attend to* an idea which has been forgotten or to a sensory stimulus which at the moment is non-existent. Any one of these may be revived a moment later and absorb the mind to the exclusion of all else, but in the description of the preceding moment of consciousness we have no concern with the subsequent mental content, even though the activity of that moment were directly involved in its arousal. We can thus speak of attention at any given moment only with reference to specific objects; attention is always *attention to* some particular impression or idea. We mean by the expression that at the moment in question we were concerned with some one thing—the object of attention—and indifferent to all others.

Attention is not an eliminable factor of the conscious life, which may now be present and then absent. The sensations arising from any organ form a series of intermittent flashes; the lines of association among ideas are made and broken from instant to instant, but it is not thus with attention. Its direction changes, it flies back and forth amid an endless variety of objects as the centre of interest shifts, but itself cannot cease or be interrupted while consciousness remains. With this meagre statement all there is to say about attention as an immediate fact of experience has been said. The term is but one of the protean forms under which the empty concept *Consciousness* appears; it cannot be described, because it has no content.

But about certain characteristic relations between an individual and the object of his present experience, about the conditions under which an object can best be attended to, the series of physical changes which accompanies such an attitude, the causes of the constant veering of attention, the results, for memory and habit, of attending to a particular object,—concerning these things we know many useful facts, and it is with them our whole practical activity is concerned.

II.

The essential thing in any attention process is, in the end, a matter of the imagination, reproductive or discursive. Objects of perception are not given full-blown. What the sense apprehends is but a fraction of the thing as the mind perceives it. Loudness is not an object, nor color and brightness, nor hardness, nor sourness, nor length. The sensations with which the individual senses furnish us are but broken refractions of the realities among which the mind dwells, and at every step, as it follows the indications of sense, the mind must reconstruct those realities out of its own past experience. Not only when to the data of one sense,—the visual apprehension of color and form, for example,—we add an awareness of all the other physical aspects, of smell, taste, tangibility and the like, which make up the object, is this process of supplementation necessary; the adequate apprehension of any single perceptual aspect of an object rests likewise upon a reinforcement of the peripheral sensational process by a central ideational one. The impression of a visual object, for example, is clearest when one is able to imagine just how the thing looks which he is about to see. The cells to be acted upon by external stimulation in such a case have already been excited by discharges from associated centres in the brain, and the fact of consciousness connected with the activity of these cells, thus played upon at once from without and from within, reaches a degree of adequacy which neither form of stimulation alone could normally produce. The most perfect apprehension of a perceptual object arises when this preparatory central excitement is most thoroughly organized and intense.

A word or two concerning the application of the term intensity which has just been used. As frequently employed in describing the phenomena of attention, it seems to me out of place. In psychology the concept of intensity is properly descriptive of differences of violence in physical stimulation, and of gradations of excitement in emotional condition, but the justice of its application to describe the clearness or continuity with which an image appears in consciousness is less evident. Its proper use is limited to two connections. The term applies with especial aptness to that variable accompaniment of the attention process which we call the sense of effort, and we speak intelligibly of degrees in the intensity of attention if we mean thereby the greater or less prominence of this feeling of activity which commonly penetrates the experience. But attention which involves a great effort is not, in virtue of that, a state of intense attention, and we do wrong to transfer the term to this essential factor of the experience. In a second connection the term is employed with greater exactness. As descriptive of the adequacy of that process of central reinforcement of which I have spoken the term is wholly justified, and in this sense it will here be used.

The effects of such ideational supplementation of elementary sensation are evidenced in a variety of ways. *Attention clarifies the object of perception.* When one out of a group of indiffsrent sensory stimuli is thus singled out from the rest, its quality becomes immediately more discriminable, its outlines grow sharp and distinct. It literally steps forward from the ranks for distinction; while its fellow, of no less virtue as an agent of stimulation, but unreinforced by any such central excitement, remains an undiscriminated element in the production of that confused mass of sensation which makes up the sub-consciousness we have of the sounds and sights, odors and contacts to which we do not attend. The indifference of consciousness has killed the one sensation; its interest has quickened the other into full vitality.

It is this anticipatory illumination of the pathway of perception which constitutes the essential fact of attention in sensorial consciousness. No intensity of external stimulation can be calculated on to arouse the vigilant attitude. The barriers must be broken down from within. When dissociation between the sensorial centres and those of associative thought is extreme, the person thus absorbed may remain unconscious of very violent sensory stimuli. Anecdotal literature is full of illustrations of the extravagant degrees to which such abstraction from one's actual surroundings may be carried.

Even when an intense sensory stimulus succeeds in breaking down the barriers and re-establishes connection between the sensory and ideational centres, it does not customarily win attention to itself; it only makes possible attention to succeeding stimuli of the same general class. Suppose a touch to have aroused one from sleep, or a sound to have recalled him to himself out of a brown study. Attention is instantly made alert; it is on the *qui vive* for any return of contact or of voice, but the original source of its awakening has escaped characterization. One is conscious of the shock and the straining of the attention in a particular direction. That whole region is shot through with activity; one imagines cause after cause of the disturbance and thrills with the anticipation of its renewal. One has an outline of the situation roughly sketched, but must await subsequent experience for the filling in of details. The wall of separation once broken down in this way and the normal connections re-established, any repetition of the naked stimulation is at once clothed upon with the full garment of perception, and stands forth in distinctness and detail.

The whole nature of the process of attention disposes us also to expect—what has more often been in dispute—*an increase in the immediate intensity of the sensation aroused*, as well as in definition of the object of perception. In two ways the process should thus be affected; the first is connected with concomitant changes in the condition of the sense organs involved, the second concerns the activity of the central nervous system itself.

To attend to a sensation is, in part, to adjust the peripheral mechanism for its reception with the greatest nicety of which one is capable. To listen is to increase the sensitiveness of the ear's response to slight impacts of the air against its drum; to look is so to direct the gaze that the expected stimulation shall fall upon the most sensitive portion of the retina, and so to dispose the refracting mechanism that the clearest obtainable image shall be produced thereon; to expect a coming taste is to accelerate the secretion of saliva and to set in motion a variety of processes which have probably the function of moistening, cleansing, or otherwise affecting the gustatory bulbs in such a way as to render them more sensitive to weak forms of stimulation. Attentiveness, in thus increasing the delicacy and efficiency of the sense organ involved, tends directly to heighten the intensity of the central effect. It reduces friction, and less waste consequently takes place in transmission.

In the second place, if our conception of the nature of central reinforcement in attention be correct, there should be an additional factor present tending to increase the intensity of the resultant sensation. The nervous substance, though highly unstable, possesses a certain inertia. A stimulation of appreciable intensity must be applied in order to set up that process of disintegration among its constituent elements which we call nervous activity. In attentive perception two forms of stimulation act simultaneously upon the centres concerned. We conceive the cells thus played upon from within to be rendered more labile, and to respond with more completeness to any given quantum of stimulation from without than when their inner resistance is wholly to be overcome by the incoming nerve-current.

In addition to affecting the definition and intensity of sensation, we should expect the attention process to increase the extent and permanence of the after-effects of stimulation. The object should not only be more clearly and vividly perceived, *but also more securely retained in memory and more readily associable in after thought.* Our explanations of the development of habit, memory and associative thought are dependent, on the physical side, upon the concept of a system of plastic elements whose structure and future functioning are being determined by the environmental forces which act upon it from moment to moment, and by the form of the processes in which it shares. The specific activities set up in the various nerve centres by external (or internal) stimulation must be conceived to leave, in their passage, some unimaginable trace on the constitution of the nerve cells, such that a predisposition is established in them to function in a similar way on subsequent stimulation. The more intense the activity aroused the more violent and extended will be the changes produced, and the more permanent their effects. What we know, indeed, is only this fact of permanence itself, and not such differences in extent and violence of commotion in the nerve centres as I have here been describing. The latter changes are hidden from our observation; we reconstruct them from the psychological facts with which we *are* acquainted. Yet it is not wholly unjustifiable thus to invoke the unknown to explain the known. What we do know experimentally of the conditions and results of nervous action in the larger sense, goes to justify such a confessedly hypothetical explanation. The preparatory excitement of the nerve-centres concerned in the perception of an object should make them more plastic to receive and retain the sensorial impression; and in this immediate and elementary sense we should say that to attend to an object is to make more deep and lasting the impression produced by it. *Attention means retention.*

There is a second aspect to this matter of retention. Attention to an object of perception means more than increased lability in the centres directly acted upon by the stimulation. It involves also an extension in the number of paths functionally open between these and other associated brain centres, and a consequent enlargement of the possibilities of recall. The object attended to is caught up in a web of connections and conceived in a variety of ways, and each line of communication with this associative system is a thread binding up the memory of the object with the general store of revivable ideas which we possess. Not by one nor a few, but by a multitude of ways, it may be brought back to mind, and if, in our processes of voluntary recall, one of these routes be blocked we may find others more open by which the goal may be reached. To give intelligent attention to an impression or idea, then, is to make it more revivable in after experience.

III.

Two aspects of experience which commonly accompany the attention process must be clearly discriminated; one is the procession of ideas which occupies the mind, the other the sense of activity which penetrates it. The ideational process presents two striking features The first is that sensations and ideas connected with the thing attended to are reinforced; the second, that all others, not thus related to it, are inhibited. There results then a selection of one system of associated impressions or ideas which starts forward into consciousness, and is maintained because it *is* such an organic unity, while all other impressions, affording one another no mutual support, fall away through their individual weakness and disappear.

The essential fact of attention in any large sense is the existence of such a central vortex about which a multitude of ideas revolves. Only a system can persist in consciousness, an interest in a particular *kind* of thing. A simple and unchanging object cannot be attended to. It becomes an object of attention only when it grows complex, when it is turned about in the mind and a series of new aspects appear and novel questions are asked concerning it. Only in this way can even a physical thing become an object for the attention. A previously excited set of related ideas, which in its simplest form may consist in nothing more than the image of the object to be perceived, is the indispensable condition of selection and survival among the elements of the stream of endlessly new facts bubbling up from moment to moment in consciousness.

Preperception, expectancy, interest, intellectual curiosity, emotional excitement,—all are terms by which we describe this fertile ground of attention upon which the seed of vagrant ideas must fall if it is to take root and spring up into fruitful thought. And all ideas are in the final analysis thus vagrant and capricious. We cannot compel the happy associations of thought; their origin is dark, and we must wait upon the fortunate winds of fancy for their appearance. On the other hand, we have the comfort of knowing that two things of practical value are within our control; if we keep our interest in a particular topic ripe by working over all the material we do possess, we may rest assured that the best possible conditions are being maintained for spontaneous associations, and secondly, if we extend the whole system of related ideas which we possess concerning a particular realm of fact, we may be confident that in the long run we are increasing our capacity for fruitful thinking in that direction. For the effectiveness with which a new idea arising in consciousness is maintained and used—its persistence and productiveness—depends upon the adequacy of the system of relations into which it is incorporated. The richer the system of ideas already in mind, to which this one stands related, the more of a fact it will appear. Every angle and facet of the system forms a starting point for associations with the novel fact.

But next, of the sense of effort. This element, commonly associated with the maintenance of a topic in mind, must not be conceived as if attention consisted of two co-ordinated factors. The two are independent variables. The manifoldness of the connections made by an idea which crops up, and the persistence of such a system of relations in the mind, have absolutely no essential dependence upon the factor of effort; nor is the greatness of effort involved any index of the range or duration of the procession of ideas which accompanies it. One may characterize attention completely by reference only to the system of ideas involved, and one may grade the degrees of effort without thought of the concentration of mind connected therewith. Intense and sustained attention may exist in the complete absence of conscious effort; intense and sustained effort may exist without any degree of successful attention or thought. One person may try very hard to play a piece of music, or to do any skilled action, and fail utterly, while another accomplishes such a piece of work admirably without conscious exertion. Is skill in music to be gauged by the earnestness of the player, or the amount of effort he makes in his playing? If one undertakes to criticize the *playing*, he has simply nothing to do with the question of effort. The piece was well-played, or ill, and the endeavors of the artist have no bearing upon the matter, nor must the knowledge of their intensity be allowed to affect our judgment of the correctness or spirit with which the composition has been rendered, though it may have much to do with our appreciation of the moral character of the player.

So, in the description of attention the sense of effort involved has no place. It does not characterize every act of the kind, and cannot, therefore, be an essential element in it. The sense of effort arises only when the field of attention has become complex. If only a single object made an appeal to the attention, if but a sole interest existed in the mind, this unique thing or topic would form the whole content of consciousness, and would be attended to with supreme and utterly facile attention. When, however, a variety of objects is presented simultaneously, each capable of impressing the mind, the attention passes back and forth among them as the accident of external or internal relation to the objects determines. For when a variety of living interests are united in one personality,—and when are they not?—of the multitude of things presented to his senses at any one time, one may appeal to this, the other to that side of his nature; one to his practical concerns, another to his hobby, a third to his humor, a fourth to his ethical activities. There is thus made possible a series of fluctuations in the direction of the attention, in virtue of parallel changes in the central topical interest with which the individual idea finds affiliation.

This veering of attention from point to point as the topical interest shifts does not, however, give rise to the sense of effort as it is experienced in what we know as voluntary attention. The process may be snapped short off by the appeal of a more novel or intense stimulation, without any sense of effort being involved in the transition. Of so many instances of the passage of attention from one object to another is this absence of friction characteristic, that it has given a name to one of two groups into which the phenomena of attention have commonly been divided, namely, *passive* attention.

Further, the passage back and forth between various objects may be repeated in such a way as to justify the terms "rivalry" and "strife" of attention in their description, while the experience still lacks the distinctive marks of effort. For the process presents the usual phenomena of fatigue. The effect of the first stimulus is, roughly speaking, greater than that of any of its subsequent repetitions, and the extent and duration of reaction in the centres tend to decrease until response finally ceases. This falling away of interest through successive stimulations we express by the contrast between the novel and the familiar, the fresh and the stale, the striking and the commonplace. The reaction to any frequently repeated stimulus thus presents a continuously descending curve, the excitement aroused growing instant by instant weaker until a point is reached when some other stimulation, though originally of no greater—or even, it may be, of less—force than that which produced the present reaction, may predominate over and displace it as an object of attention. Thus of two objects appealing simultaneously to the attention, the interest in that which was first successful in drawing attention to itself may die away, and attention turn to the second object, originally unattended to because less attractive. An endless succession among the objects of attention is thus conceivable without any parallel increase in the intensity of the stimulations, the rhythmical variations being due to phases of fading in the process of internal change which the stimulus sets up.

Simple transition of attention, succession of interests, does not necessarily involve the experience of effort. Such oscillations are most frequent in those types of existence which we consider least capable of sustained effort and of voluntary attention: namely, the child, the savage, the lower animals. Here the race seems always to the swift, the battle to the strong stimulation, for the organism is practically at the mercy of the external event for the character and succession of its mental occupations.

For the experience of effort we must turn rather to those conditions in which there is most continuity in the interest and systematic unity in the object of attention. We must conceive of such a topic of attention as I have described above maintained for a considerable period of time, not continuously, but reappearing time and again as the dominant centre of the attention process. But again, though our experiences of effort are chiefly connected with the maintenance through successive disappearances and emergences of such a persistent object of attentive perception or thought, these periodic oscillations do not in themselves constitute the characteristic feeling of effort. The presentation of a certain object may instantaneously arouse the whole set of associative memories which constitute one's interest in that object, and the attention be concentrated upon it from the outset, yet without any feeling of exertion on the part of the subject experiencing it. And if he be not in a resolute mood, or if this topic have no important relation to his practical life, it may dissolve away like a breath before the onset of a fresh stimulation, and return anew upon his supine consciousness as often as the novelty of the interrupting stimulus dies away.

Nor can we connect the sense of effort characteristically with a particular direction of change in the process of transition; for attention to an object of perception may as really be diverted by the flashing of an idea upon the mind and restored by voluntary effort as is that to a topic of thought interrupted by a sudden strong or interesting sensation and brought back by a direct effort of will. It is perhaps true that interruptions are more commonly *of* the thought and *by* the perceptual object than the reverse, both for the reason that the latter has had historical primacy in the series of life interests, and because it is always present to occupy the place of the interrupted thought, while it is not possible to assert the converse.

We may, perhaps, connect the characteristic sense of activity in the readjustment of attention in one way with the direction of change which the transition follows. The permanent element in any series of ideas through which runs a thread of continuous attention is the conception of that system to which every member of the group is organically related, and which I have called the "topic of thought." Now the characteristic lapse of attention, when no outside interference breaks through, is by the suggestion of a wrong associate by some single image which may itself be perfectly in place, but which, in virtue of the fact that every such image is many-sided and forms the potential starting point for a variety of connections with past experience, may in the present instance give rise to an incongruous instead of an appropriate sequence. When a process has thus been interrupted, and the rein is brought to bear upon the vagrant fancy, the return is customarily not to the particular image from which the byway originated, but to the general topic of thought itself. In so far as the phenomenon of voluntary control can be connected with any typical direction of change in the mental attitude, it represents this periodic return to the relatively formless and abstract concept of the general purpose or system of relations about which the whole group of ideas revolves.

IV.

We must look to other elements for the characteristic associates of the feeling of effort. One of these associates is muscular tension. In all attitudes of sensorial alertness it is paramount. During conditions of rest, such as the sensorial inattention of our waking hours, or the unconsciousness of sleep, the organs of the special senses approach a condition of general relaxation; the eye-balls are immobile, the axes of vision approach the parallel, the tension of the ear-drum is released, the mobile exploring members of the body cease their movements and lie at rest. The innervation of the bodily processes connected with perception is at its lowest ebb. Let any object now arouse an animal to activity from such a condition of rest; let it attract attention and stimulate interest. The animal springs to its feet, every muscle tense, every limb prepared for action, to spring forward or to retreat. The eyes are converged upon the novel object and accommodated for clearest vision, while the balls quiver with swift movement as they follow every slightest motion of the object of attention. Not only the special sense most directly and intimately concerned in the process of observation is thus in active tension, the strain is shared by the whole set of senses to which perceptual objects may appeal. The muzzle is lifted and the distended nostrils grope after faint odors which the air may bear, the ears are pricked forward and strained to the nicest tension for sounds which may supplement or correct the interpretation of the eye. The whole organism, in short, shares in the unitary act of attention. This primitive type of attention is the original of those manifold states which we connect with the term, and in its characteristic attitude lies the germ of all the elements which our own more varied and subtle processes contain.

In sensorial attention some one sense is immediately concerned, to which all other processes are supplementary and secondary. The organs of this sense present a condition of high and constantly varying tension in responsive adjustment to the changes occurring in the object of attention. Secondly, this tension involves really the whole set of sense organs, and not solely that through whose activity the special mode of observation is carried on. We attend with the whole body, not with an independent set of adjustive muscles, nor with a disconnected group of nerve centres. In the highly complex processes of attention presented in human beings, for whom its objects are often extremely artificial, the dissociation between the activities of the various organs and central processes is much more pronounced than we have any right to conceive it to be in the experience of the lower animals. To these forms of life we must look for the primitive types of activities which in our own conscious experience are often so elaborated and complex as to baffle the powers of analysis; and in them we may frequently find the clue to explations which we have sought in vain in the mazes of our own psychological life.

The primitive unity of the object of attention and of the organism's reaction to it becomes clearly evident in the group of activities with which the higher vertebrate responds, let us say, to an object of visual perception. For the observant animal it is not an object for sight alone, but for all the senses equally. It is a mere accident that at any given moment the stimulation of those other senses is in abeyance. The object is perceptually one because it is teleologically single, and the animal's interest in it is supremely practical, to take or to avoid, to seize a quarry or to escape a beast of prey. The discrimination of these two broad and significant classes, and the reference of individuals to their proper headings, is a matter of life and death to the brute, in which every sense is constantly called upon for assistance. To be absorbed in the prospect of the eye, while hearing and smell are vacant-minded, is to invite a destruction from which alertness in these directions might have brought deliverance. Every sense, therefore, is simultaneously strained to receive the earliest intelligent message of the nature of the object observed. The animal is a single sensitive organism, quivering with activity throughout its whole extent, and shot through with a vast system of tensions which must give rise to a sense of severe general strain, underlying and throwing into relief the adjustments occurring in those sensorial processes most directly connected with the act of attention. And out of this widespread and unitary process of adjustment to an object which is at once as intellectual as the animal possesses and as sensorial as can be conceived is differentiated the complex and often vastly obscure phenomena of effort which accompany our own processes of voluntary attention.

V.

The elaboration of attention proceeds in two directions, or exhibits two stages: firstly, the isolation of single sensory organs as instruments of apprehension, and secondly, the rise of objects of attention in which the intellectual factor progressively advances in importance, while the sensorial element correspondingly declines. It is among our commonest experiences to attend to objects which engage the activity of but a single sense, instead of engrossing the faculties of the organism as a whole. Indeed the objects with which we have to do are frequently such as can be apprehended by no other sense than the one employed, and have no real existence for the organism at large, since they cannot enter into any direct practical relation with its life. The words of articulate speech which we hear spoken by our acquaintances, and the signs which we read on a printed page are examples of what I have in mind. Our attitude toward these objects is not comparable with that of the beast of the forest when the cry of his fleeing prey or the leap of his pursuer urges or warns him to immediate violent action. The coöperation of the body in these human processes has apparently fallen completely away. There are no auditory or tactual or gustatory or olfactory aspects to these things, such as every object of experience possesses for the brute. They have their origin, indeed, in certain physical arrangements which are capable of appealing to these senses; we can touch the person who speaks, we may smell the paste and pulp and leather of the book from which we read, but these things have absolutely no significant relations with the real object of our attention in the two cases cited. In each of these instances the object is a system of ideal elements, the mental images called up by the succession of visual or auditory symbols presented to the senses, and for the apprehension of these objects no other avenue is open but the highly specialized one immediately involved. One cannot understand a man's words by watching the vaporous forms which his breath may take as he speaks in a frosty air, nor come at the import of a book by weighing it in the hand or observing the tint and shape of its leaves. Such a division of the object of attention, or rather an object of attention which thus appeals to a single sense in isolation from its fellows, never comes within the beast's range of experience. It depends upon conditions of life from which the lower animal is separated by an impassable gulf,—upon the rise of disinterested curiosity, of æsthetic values, and the like. For the beast, the printed page, the colors of the sunset, the contours of the statue, the melodies of music, simply do not exist. A world of auditory or visual perceptions which is *nothing but* such a world the type of mind here under discussion cannot conceive.

This resolution of the world of sensorial stimulation into its qualitative elements, and the construction of each series into a separate and independent system of significant objects, very markedly affects the associated phenomena of voluntary attention in the human being. It practically eliminates those characteristic accompaniments of the more primitive type of attention, which arise from the concomitant adjustment of secondary sensory processes. It thus reduces the amount, while it concentrates the direction of the physical discharges involved in the act of attention. It replaces conditions of general body-strains by equally typical bodily relaxations. The instruments of the laboratory psychologist reveal a well-marked decline in the sum of physical movements, including the disappearance of both larger purposeful reactions and the minuter spasms and tremors of the muscles during close attention.

These forms of inhibition are indeed not confined wholly to the secondary manifestations of attention to artificial human interests. Some are shared in common by man and brute, since the absence of movement is sometimes as important a factor in the relation of the savage animal to the object of its attention as is its opposite. Furthermore, some of those accessory phenomena which characterize attention in the human being, and from which he cannot free himself, are at once impedimenta to the full performance of his own functions, and evident heritages from those more primitive and savage conditions of an early ancestry, from which the forms of his later life have delivered him.

One such mark of attention—whether sensorial or ideal, but chiefly sensorial—is the periodic suspension of the breathing, alternating with sudden and irregular respirations, which takes place parallel with the pulses of attention. Could this reflex interference be done away with and the normal process continue, unaffected by the mental attitude, we should expect, in virtue of the more sustained and uniform nourishment of the central nervous system, a fuller and more continuous process of attention. The inhibition is a hindrance, not an aid, to it. But though in us it be, from the form of our civilized life, but a bit of cumbering rubbish, as are so many other residual functions of the body, yet under conditions of life in which movements or their absence were cardinal factors of detection and escape from observation, such an inhibition of the very breathing must have been of the utmost importance to the animal, whether preyed upon or preyer. Nevertheless the disassociation of the senses in human acts of attention does add to such primitive inhibitions a great range of new inactivities, by which in him attention is as positively characterized as in the beast it is marked by widespread bodily tensions.

VI.

But further, this specialization of the object of sensory attention and focalization of the process of adjustment is rendered possible only by the development of a highly complex set of central changes, which we describe psychologically as the rise of an organized system of associated ideas. A series of musical tones becomes an object of attention only in consequence of our capacity for discriminating a vast variety of qualitative and intensive differences between the tones, and for æsthetic apprehension of as wide a range of harmonies and disharmonies among them; and with these relations the mind must be capable of continuously occupying itself as the combinations and successions of sound are presented to the ear. The medley of light and shade which makes up a printed page is the merest filiip to the attention, and the eye follows the type back and forth across the sheet only because a parallel series of beautiful or significant images is unfolding itself instant by instant in the mind of the reader. The immediate sensory attention, which, in the case of music, is already subordinate, is here wholly secondary and mechanical.

Under such conditions as these only those interruptions which appear as breaks in the continuity of this ideal series should be counted as lapses of attention; and for their physical correlates we should look, not to the primary phases of activity or inactivity in the visual or auditory centres of the brain, but to the activities of those secondarily associated centres upon which the appearance of the idea depends. Interruptions in the primary visual series, for instance, should be insignificant, so long as the breaks in the adjustment of the organ of sense do not interfere with the continuity of the ideal series. As a matter of fact, we know that perception in reading is intermittent, and that the movement of the eye across the page is by a series of flights and perchings, during the resting periods of which only are the conditions of nervous sensitivity or connection such as to permit the reception of a conscious impression. The eye may fail altogether for a time to make the proper adjustments, yet the attitude of consciousness be unchanged, because the pregnant and luminous mind has leaped the perceptual chasm and welded the logical connections of the theme out of its own associated stores.

But let the connection of ideas once be broken, let the thread of thought which the printed symbols are designed to support once be dropped, and no one will be persuaded to speak of attention in connection with the experience, no matter how closely the eye follows the characters or how faithfully the mechanic voice reproduces their sounds. Attentiveness here is an expression for the fact that the visual or auditory characters have aroused from instant to instant the appropriate set of logically connected ideal symbols, which themselves stand for emotions, attitudes and deeds in the real life.

In the fluctuations of this total process that aspect which we know as the voluntary return of attention to its object should represent an activity by which one re-establishes the functional connection of associated centres in the brain, and so sets going again the clogged mechanism of thought. The sense of activity in such cases should depend upon a readjustment of the central, not of the peripheral, attitude; the strain felt should be one of brain exertion, not of muscle tension. Especially should this be the case when the process of consciousness is independent of the immediate activity of the senses, and attention consists in holding in mind a consistent sequence of related ideas.

But no amount of introspection will reveal the presence of such an activity, apart from certain adventitious elements, which are themselves sufficient to account for the whole experience of effort which the oscillations of attention present to us. When any one catches himself, in a moment of unanticipated introspection, in the act of thus forcibly thrusting attention back upon its object, he finds a large group of more or less obscure muscle tensions, centring about the head and neck, which varies with the nature of the ideal object of attention, the strenuousness of his mood, and the whole past history of his individual habits and types of reaction. The head is dropped or the chin tilted, the eyes are turned upward or narrowed, the brow is wrinkled, the jaw clenched, the breath suspended, the whole body made rigid in the attempt to withdraw the wandering attention and centre it again upon the forgotten topic. And however often the moment of such eavesdropping on the naïve effort to attend may return, introspection reveals a variation of these effects, and nothing more.

These peripheral adjustments are not made at random. Some are evidently the residua of organic adjustments of high importance to successful attention in sensorial fields. The fixed jaw and general body tension are reinforcing accompaniments of all serious physical exertion. The puckered brow, the raised or bent head, are but the necessary secondary adjustments for acutest vision or hearing. And in the attempt to maintain attention on a topic of connected thought, this system of associated but immediately purposeless reactions, is carried over by inveterate habit into the field of ideal attention, as the expression of physical disgust has been similarly transferred to become the symbol of spiritual dislike. Though serving no direct function in the re-establishment of attention, these physical changes cannot be held ineffective. They probably act as preventives of inattentiveness by inhibiting various distracting processes, both peripheral and central. Others of these physical accompaniments of attention are directly productive of a reduction in the total amount of peripheral stimulation, by inhibiting in part or in whole the action of the sense organs, as when the eyes are closed or the body kept motionless with suspended breath.

I believe the mechanism of voluntary control extends only to these environing conditions under which rational thought takes place. We can withdraw our eyes from the distractions of the street and fix them upon the pages of our book; we can break up the tattoo of the fingers or the habit of humming which has got under way; we can repeat the words of our lesson, or read the last sentence in our uncompleted theme. But when this is done we are at the end of our tether, and must sit down and wait for the unlimed thought to return of its own accord within reach of our hand. In less figurative language, the intimate central conditions of associative thought are still wholly obscure to us, and we have no direct means of re establishing connection among them when once they are broken. Often the escaped thought resists capture, in spite of the most intense longing and practical need to call it back into consciousness, and scarcely less frequently is the truant afterward found at perch in its cage as familiarly and contentedly as if it had never been astray.

The sense of effort connected with voluntary renewals of the attention, then, derives from a varying group of peripheral motor adjustments, and does not consist in any immediate consciousness of spiritual activity other than this. I say *other than this*, for it seems to me purposeless to deny to this experience the name of activity. Whatever be the metaphysical reality of this activity, or its relation to physical antecedents in the world of causation, if there be any phrase to which we have a right as descriptive of immediate psychological experience, it is surely this of the feeling of our own activity. These phases of voluntary attention can never be satisfactorily described in a statement which leaves out of account this enormous psychological difference between the reflex adjustment of the sensory and motor systems to the object of passive attention, and that experience of effort and strain involved in restoring with a wrench an interrupted attitude of attentiveness to an unattractive or displeasing object. It is an experience which must be sharply discriminated from the preceding and I know no better term by which to describe it.

VII.

Continuity of the simple object in consciousness is as little characteristic of the attention process as is fixity of the organic adjustment. In all its higher forms permanence is of the complex, not of the simple, object in consciousness. The topic is maintained only by constant recreation through the development of ever fresh aspects of its nature, of new-thought-of connections between it and other things. Continuous attention to any given object presents a kaleidoscopic stream of individual images and ideas which enrich the topic as it is rolled about in the mind.

For an enduring existence of the single object before consciousness we must turn to the literature of abnormal psychological functioning. In pathological literature the persistence of an idea before the mind is called an *obsession*, or insistent idea. The more persistent it is the more warped from the normal type of human functioning the individual manifesting it is considered to be. In such a monstrous, death-in-life experience the object of regard fills the whole horizon, displacing all that we can intelligibly call consciousness and absorbing the personality of its victim, who can no longer be said to be a mind. It is possible that in more primitive types of consciousness than ours such conditions of mind were more nearly and more frequently approximated than ever in our own normal experience. They likewise may be conceived to arise in the less differentiated worlds of the lower animals. Our own normal life shows the nearest approach to such states under conditions in which the mental content is greatly simplified while the emotional excitement is intense, as in the attitudes of surprise or terror. To such simplicity the mental view of the mystic or fakir is said to approach when he concentrates his attention upon a single object, and is lost in the unchanging contemplation of the infinite, or whatnot. The phenomena of hypnotism also present conditions in which a single idea appears to monopolize consciousness. In all such states there is probably presented a phase of retrogression toward a more primitive type of mind, from which our own is distinguished by its complexity and instability.

Our interest lies not in such states as these, but in the nature and conditions of rational attention, in which adequacy of function is determined by the persistence of a topic of thought in the midst of constantly changing ideas. The highest degree of attention, under this conception, is that which combines the greatest unity of relationship with the widest variety of ideas under it.

For all higher forms of the attention process this factor of change is indispensable. The object which does not develop simply goes out. It must change or cease to be attended to. Attention feeds upon the novel; its vitality depends upon the possibility of finding fresh aspects of its object from moment to moment. When the variety of its field is exhausted, attention flies from it. This applies equally to sensorial and ideal attention. One cannot, *simply cannot*, stare vacantly at an unchanging idea, and keep staring. The exceptionless rule is that if variety do not develop out of the object, it will penetrate consciousness from extrinsic sources. The idea which does not bud and blossom will not stay by one; in spite of effort, the novel idea, upon which one would *not* fix his attention, will supplant it. The topic of thought must make fruitful connections in the mind if it is to continue to occupy consciousness.

The conditions of successful and long continued attention thus become evident. The external stimulation, however intense, the original idea, however novel and interesting, are but the seeds of attention. As in the development of a habit out of the impulse toward a particular reaction the tendency must be realized in repeated deeds, so in attention the stimulation or idea must be worked over and elaborated if it is to remain the object of continuous regard. One must give one's mind to the thing in hand, and *one must have a mind to give*. The elements which are contributed out of the stores of past experience are the important factors of attention. The new object cannot make connections in the mind unless there be already there ideas belonging to the same common system of experiences. The past history and present level of development of the individual, therefore, become of the utmost significance in determining his capacity for attention to any given topic. In proportion as his experience in the particular province to which the new object belongs has been varied, his retentiveness of it adequate, and his interest in it well conserved—that is, in proportion as the system of connected ideas is rich and easily excitable—the attention which the individual is capable of giving to that object will be effective and sustained. The more one has attended to a particular kind of objects, the more he will be able to attend to new objects of the same class; "To him that hath shall be given, but from him that hath not shall be taken away even that which he hath." Without a modicum of such experience attention can scarcely be conceived to take place at all, for there are then no ideas to which the novel object can adhere, and what is not thus anchored in the mind drifts swiftly away. For we remember as we attend, by weaving the idea into a stable system of relations in the mind, each of which helps to strengthen its integrity with the whole realm of ideas and impulses which constitute our concrete personality.

VIII.

The system of ideas to which a given object appeals may be common to every member of the human race, .or it may be the result of narrow and artificial specialization. In virtue of the limitation of special interests the same object may be devoid of attraction for one and incapable of holding his attention, while for another it is surcharged with interest and may engage his activities for a long period of time. Black-letter editions, the price of stocks, the glimmering of a new star, the first, lurching steps of a child, the cut of a coat or color of a tie—how full and how meagre, how significant and how meaningless, how absorbing and how inconceivably wearisome is each and every one of these things to those who possess and those who lack the background of experience and interest to which they make their several appeals?

The object, to be attended to, must thus appeal to some preexisting interest, practical or theoretical. How shall one continue to regard a plant if he be neither herb-gatherer nor artist, botanist nor fortune-teller, florist nor mystic; if he neither hunger for it, nor admire it, nor be curious about it, nor reverence it; if there be neither practical nor æsthetic nor scientific nor religious interest in it? It is inconceivable that he should do so.

The absolutely novel is the uninteresting. But let that novel object make a single vivid connection with something treasured in our own experience, let it arouse the memory of something already made our own, and instantly it thrills with life, and the awakened attention seizes eagerly upon it and explores it. For we cannot baldly say that the degree of attention which a thing receives from us, or which we are capable of giving to it, is in direct proportion to the amount of previous knowledge we possess in that general field. Experience is constantly proving the falseness of such a theory. The attention which an object receives depends more intimately upon the importance of the system of ideas to which it appeals, and the momentary excitability of these ideas, which we call our interest in the matter, than to their number and variety. The beginner of a new study, thirsting for fresh knowledge, shows often as intense and sustained interest and attention as the mature scholar who is deep in the lore of the subject.

The origin of such interest is not always plain to us. The objects to which it attaches are not without exception important objects in the practical sense. They may be separated at almost every point from the primary needs of life. We are fain, in such cases, to fall back upon the concept of primitive impulses appearing independently of external relations, and manifesting some intrinsic characteristic of the developing organism. We should perhaps speak of a *Will to Know* as well as of a *Will to Believe*, for the former is as original in its appearance and as fundamental in its character, as the latter. We do not explore the world because of the use which we hope to make of its objects, but from the simple delight of exploration. We are not curious about those things only whose nature it is important for us to know, but about everything that lies within reach of our catholic observation. We peer and pry, we analyze and are baffled and return to the attack until success crowns our efforts or life is worn out in vain wrestling with the problem, *simply because we must*. It is a *Trieb der Natur*, mightier than we, to which we bend. But not an impulse the nature of which we cannot understand. It is an irritable curiosity which we share with the brutes, and which must have been of high importance in the preservation and development of animal life. To be alert and vigilant, to make oneself master of the facts by which one was surrounded, to be unresting till the new object or the new locality was investigated, and its relation to oneself—in the most elementary and practical fashion, indeed, but still in all essential regards—was understood, must have been impressed upon the brute by long and painful experience as one of the most fundamental lessons which nature had to teach. "Be curious, be enquiring," Life said to her disciple; "to lack interest in your surroundings is to perish." And the lesson was learned so thoroughly that even such late descendants as we continue, in spite of our intelligence, to singe our wings in flames of useless knowledge.

Our life manifests this outward-facing, many-faceted curiosity most strongly in childhood, when the traces of our ancestry are most clearly to be seen, and when we are passing through a range of growth phenomena by which the mature individual is to profit, though he do not manifest them. For the constant veering of attention in the child I conceive to be due to two factors of inconstancy, one positive and the other negative. The first is the presence of a transient instinct, strongest in early childhood, but persisting as late as adolescence, expressed in an overmastering impulse to react upon and explore all the objects of one's neighborhood. The second is an absence of any systematic knowledge about these objects, which is an indispensable condition of continuous attention to any one of them.

The itch for miscellaneous knowledge declines in early manhood, and has practically disappeared by the time of mature life.

The individual meantime has gathered a vast store of knowledge about particular facts, and has selected a wider or narrower range of special interests, about which his activities revolve, to the exclusion of all other conceivable fields of exploitation. About most things which may occur he has some knowledge, and concerning those which nearly affect or interest him he has a rich background of experience upon which he may draw for entertainment, and in which the attention may bury itself for interminable periods, oblivious of every external happening. It is this capacity which makes long-enduring attention to a single topic possible for the mature person, in the face of solicitations from a variety of intense or exciting stimulations. The capacity for sustained attention becomes thus an index of the progressive advance of the individual in intellectual acquisition and control. It should no more be expected of the child in any high degree than the man's stature or his growth of beard. The phases of its evolution depend more upon his organic temperament and the processes of growth and nutrition than upon special training and the application of rules.

One or two practical maxims may, however, be set down. Attention to a particular object can be won only through what the child already possesses.

In introducing the child to such an object have him draw as largely and in as varied a manner as may be upon such personal knowledge.

Wherever possible connect the new object of knowledge with the child's elementary practical needs and enjoyments. These are, and continue to be for us all, among the acutest and most moving things of life.

Maintain the child's interest as long as possible in one thing; it is more important than to be fastidiously careful against wearying him. Education consists in the arousal and establishment of interests which previously did not exist for the child, and it is a healthier attitude to be eager to turn one's face toward the novel than to be anxious to turn it away from the stale.

Finally, encourage and abet the child's every sane and healthy curiosity, and his desire to exercise his faculties directly upon every variety of object with which he comes into contact. The wider his acquaintance with the general material of human experience, both in the way of information and in that of reaction, the greater will be his sagacity in understanding and exploiting the special materials with which he will be called upon to deal.

Fatigue.

By Wm. H. Burnham, Clark University, Worcester, Mass.

THE word fatigue is used in two senses: first, to denote the feeling of weariness; second, the nervous exhaustion that results from functional activity of the nerve cells. The former is a psychological fact, the latter a physical fact. Hygiene has to do primarily solely with the latter, *i. e.*, the physical fact. It deals with the former merely as a symptom and finds that the two are often concomitant, but not always. This distinction is important; the failure to make it has resulted in much useless discussion, in confusion of thought and perhaps some needless experimentation. Both observation and experiment have shown that children who *feel* weary will respond to a sufficient stimulus and do perhaps as much intellectual work as at any time. The child weary of the school task turns to what he likes and all evidence of fatigue disappears. All this is in accord with the psychological law of the relativity of feeling. The strong feeling of intense interest drives the relatively weak feeling of weariness out of consciousness until perhaps the latter becomes so great that it reasserts itself and interest in turn flags. But throughout the whole process the physical fact of fatigue may have persisted.

The physical fact of fatigue, that is, the nervous exhaustion, seems to have been demonstrated by the researches of Hodge, Mosso and others, which indicate that during functional activity the substance of the nerve cell is used up and that recovery occurs only after a prolonged period of rest. Of course the metabolic processes involved in work and rest are going on all the time. The way neurologists regards this is well shown by the words of the English physiologist, Foster: "In every tiny block of muscle there is a part which is really alive, there are parts which are becoming alive, there are parts which have been alive but are now dying or dead." Changing the words the same may probably be said of the nervous tissue. But by fatigue we mean a condition where the building up processes do not compensate for the breaking down processes involved in the expenditure of energy, and where probably the waste products are not carried away with sufficient rapidity.

There is every reason to believe that definite physical changes in the nervous substance accompany mental activity. Mosso has found both an increase in the blood supply to the brain and an increased generation of heat during mental activity, and he believes also that by the functional activity of the nerve cells toxic products are formed that pass into the blood and poison the other tissues. That physical changes accompany mental activity seems to have been demonstrated further by the researches of Binet in the Paris laboratory. Testing with the plethysmograph, the sphygmograph, and the like, he found that the action of all the chief organs of the body was modified during intellectual activity, as shown by the changes in the respiration, heart beat, the vascular circulation, etc.

Such studies have put the problem of cerebral hygiene on a definite basis and appear to have demonstrated the physical fact of fatigue as a result of intellectual activity. They also show that fatigue is the normal result of the expenditure of energy. The expenditure of energy is as important in the economy of the human body as the storing of energy. The aim of hygiene is merely to keep this expenditure within the limits of health.

The problem of hygiene is this: how to do the maximum amount of intellectual work with an expenditure of energy within the limits of health. This is an extremely difficult problem for an individual to solve for himself. It is much more difficult to solve this problem for a class or group on account of the great individual differences to resist the power of fatigue. The problem seems almost hopelessly complex when it concerns a group of individuals in the period of growth and development. For such it is, not merely the problem of determining the most suitable periods of work and rest, but also of training to habits of economic activity; for within certain limits the individual's power to resist fatigue can be increased by training.

We cannot shirk the problem on account of its complexity. It is one that must be met every day in the class room and solved, at least, provisionally. In recent years a serious attempt has been made to study the matter scientifically and to get some more satisfactory conclusions than result from mere pooling of opinion based upon desultory observation. Physicians, alienists, psychologists, physiologists and educators have all attacked the problem, and two classes of methods have been used. First, the attempt has been made to gauge fatigue by its physical concomitants. The method which has been most used and with best results is that of testing fatigue by noting the difference in neuro-muscular power before and after a period of mental work. This has usually been tested by the ergograph, an instrument devised by the Italian physiologist, Mosso, for measuring the work done by a group of muscles. It is a relatively simple apparatus, in which the arm is placed in a horizontal position and a weight lifted by contracting one of the fingers or the whole arm. The amount of contraction is registered by a pen that writes a curve on a revolving drum, and the amount of work done is estimated from this curve. Several investigators, especially Kemsies in Germany and Smedley in Chicago, have used this instrument in testing the endurance of school children. The æsthesiometer (compass points) has also been used with school children in the attempt to test fatigue by testing the discriminating dermal sensibility before and after a period of mental work; but recent studies, especially by Dr. Leuba, have cast grave suspicion upon this method. All the methods of this class are technical and require the supervision of a trained expert.

Second—The attempt has been made to gauge fatigue by noting the quantitative and qualitative variations in the mental work done during a limited period under definite conditions. Simple sums in arithmetic, dictation, filling the gaps in mutilated sentences, etc., are among the methods most commonly used.

Such investigations of fatigue in school children have been made by Sikorsky twenty years ago by the dictation method, who found from 20 to 30 per cent. more errors after the school work than in the morning; by Burgerstein, using simple arithmetical work for a test, the result being a marked increase in the quantity but a decrease in the quality of the work during the course of a single hour; by Miss Holmes in California, using the same method and finding in the main similar results; by Höpfner, who used the dictation method and found that the quality of work decreased as the time of work increased; by Friedrich, who used both the dictation method and that of numerical calculation, and found that a decrease in the quality of the work corresponds to an increase of the school hours; by Richter, using problems in algebra and the inflection of Greek verbs; by Ebbinghaus, using various methods, notably that of letting the pupils fill the gaps in mutilated words and sentences; and by Dr. Thorndike and others, using various modifications of the methods already mentioned.

Of the class of methods that have just been described, dictation, or some test involving work similar to that done in the ordinary school routine, seems most to be commended for the study of fatigue with a class of school children. Such technical methods require, of course, considerable time and some psychological skill. Each teacher may, however, judge by observation of the pupil's condition and power to resist fatigue. Among the more characteristic symptoms of fatigue are the following: Restlessness, lack of power of co-ordination, showing itself in the dropping of pencils and the like, in slips of speech, and perhaps in uncertainty in the use of the limbs, twitching movements, decreased sensibility, especially of sight and hearing, flushing, unusual color of ears; and among the mental symptoms, irritability, loss of memory for common things, loss of curiosity and the power of attention, disturbance of speech, etc.

In answer to the question, how the maximum amount of intellectual work can be done with an expenditure of energy within the limits of health, a few general results appear from experience and the investigations already made:

First—A habit of vigorous work is essential. Elsewhere in the NEW YORK TEACHERS' MONOGRAPHS, Volume II., No. 3, March 1900, in an article on the training of the will, the writer has attempted to show that intense effort is necessary for education. It should be added here that the explosion of energy in intense effort is apparently a normal condition for the healthful functioning of the nutritive, building up processes during a succeeding period of rest.

Second—To make intense effort possible it is necessary that suitable periods of rest should alternate with periods of work. This is the great law of mental hygiene; it is equally fundamental to rational pedagogy.

Third—There are great individual differences in the ability to work and power to resist fatigue. Some fatigue quickly, others slowly; some do their best work in the forenoon, others in the afternoon, and there are many mixed types.

Fourth—Within certain limits the individual's ability to resist fatigue can be increased by practice; and, on the other hand, the power of endurance may be permanently decreased by working beyond one's normal period.

Fifth—While it is extremely difficult to draw any line between normal fatigue and over-fatigue, it appears that whenever children are disturbed in their sleep as a result of the day's work and go over in their dreams the activity of the school, or when they come to school tired and nervous in the morning, they are suffering from over-pressure.

Sixth—On account of the great individual differences in the power to resist fatigue, some children in every class are probably over-taxed by an amount of work quite normal for the majority; hence especial care to observe and test for fatigue in the school is necessary.

Seventh—An individual may be in a condition of permanent fatigue without knowing it. The *feeling* of fatigue is no accurate gauge of the fact of fatigue.

Eighth—Recent investigations strongly suggest what experience has long shown that hurry, confusion, habits of emotional prodigality and worry produce great fatigue and are likely to occasion permanent nervous exhaustion.

The concrete application of these principles must be determined largely by individual capacity and local conditions. Wherever possible, however, an approximation to the plan outlined below would seem wise. While the investigations already made do not warrant any definite and final rules in regard to the period of study, the following is a provisional solution suggested by the results of observation and the studies already made. The rules are given with arbitrary brevity but with no desire to ignore the complexity of the problems involved, and distinctly as provisional:

First—The number of hours in the school day should not exceed two or three for children under 9; four hours for children between 9 and 12 years of age; and five for those 12 and 14 years of age; and special care should be taken for children easily fatigued. In grading, physical condition as shown by height, weight, strength, etc., should be considered as well as standing in the school subjects.

Second—As regards the length of each period of study, the conclusion of Dr. Brahn of Berlin, appears wise; namely, the school period should not be more than from 20 to 25 minutes for children from 6 to 9 years of age; 30 to 35 minutes for those 9 to 12; and 40 to 45 minutes for the older ones.

Third—In most schools the time devoted to recess should be increased. In high schools there should be from 5 to 15 minutes recess after each period. The advantage of this seems to be demonstrated by experience as well as investigation. For many years in Prussia 40 minutes of recess for each five hour period of school work has been prescribed by law, and about a year ago a law was passed requiring that at least 10 minutes of recess for each hour of instruction be given, the longer recesses being placed after each two hours of instruction.

Fourth—Contrary to the opinion and practice of many, whenever possible the recess should be spent in free play out of doors.

Fifth—The studies of fatigue corroborate experience in indicating that some studies are more fatiguing than others, and in suggesting the importance of placing mathematics and ancient languages in the morning, manual training, gymnastics and the like in the afternoon.

Sixth—Unless local conditions make it possible to have only one short session of not more than three hours and a half, it seems better in the grades below the high school to have two sessions separated by an intermission of at least an hour and a half in length.

Seventh—Gymnastics is important for its own sake and not to be considered a means of recreation from other school work. The time devoted to it should not be regarded as part of the recess.

Eighth—It is specially important that the teacher observe each individual, and, so far as possible, adapt the periods of work and rest to each pupil's capacity, while special tests should be made whenever practicable.

The Development of the Child Mind.

By John Angus MacVannel, Columbia University.

IN so brief a treatment of a subject such as this the problem is how to give, not an adequate impression—that is impossible—but any impression at all worthy. Where the materials are so vast and their ordering as yet so incomplete, the task of selection is very difficult. The so-called "scientific" study of the child mind has brought to light so many facts that it may truly be said that at the present time the study is considerably in advance of the science.

Mind is no longer regarded as a fixed substance, nor as a *tabula rasa*, nor yet as composed of various faculties existing in more or less mechanical juxtaposition to one another. It is no mere mechanism, but is essentially an *energeia*, a living, spiritual principle, the indispensable condition of whose change and growth is activity. The mental life is a genesis, a becoming, passing through certain fairly well-marked stages and following certain laws in its development. No experience which comes to the mind is wholly writ in water: whatever influence enters the circle of the mental life has its never so little effect on the mind's future reactions and is transformed into an element of those accumulated modifications in which growth may be said to consist. The product of past processes persists in the mind and forms the basis of subsequent adjustments. The mental life is unitary in its character; it is also a continuous thing "without break, crack or division," and exhibits more and more in its growth and development a purposive tendency.

It is customary to say that, like that of all other living things, the growth of the mind is from within outward. There is a vast distinction between the extension of a brick wall and that of a tree, and there is a vast difference between the growth of a tree and that of the mind. In the last two the growth is from within outward; it is through inner activity—inner self-activity.

This is all true; and yet just here there is danger of seriously misunderstanding the nature of the mind's working and of its development. Because of our use of the words, life, organism, digestion, assimilation and so forth, we go on to say that the mind grows by what it feeds upon, that it must develop naturally, that it must have food and so on; yet we must not for a moment forget that such ways of speaking of the mind and its action are symbolic and metaphorical in the extreme. Things possessed of physical life grow and develop by the destruction and consumption of their environment. The mind is a spiritual principle and is not to be considered as on the same level as merely organic forms. Since the mind is a spiritual principle it does not grow by accretion or mechanically like inorganic bodies, nor does it develop like organic bodies through the destruction and assimilation of things in its environment. One of the great difficulties at the present time among so-called physiological psychologists is to distinguish the physical and the psychical fact. From sensation up to the highest form of thought the process is one of increasing idealization, or creation. It is not through the assimilation of materials hitherto foreign to itself, but through a virtual act of creation within itself of an intellectual and moral cosmos that the growth and development of the mind proceeds. Mental development is self-development. It is such in the child; it is such in the man.

Nearly all that may be said of mind in its beginnings in the child may be said in the words of Prof. Ladd: "In the beginning was mind, already equipped to receive sense impressions, to attend, to discriminate, to feel, to form its own faculties of the more complex and higher sort." At birth some stages in the preparation for the slow development of mind have been passed. The brain is not fully organized, the mind is far less so. The sense-organs have reached a stage far in advance of any corresponding psychical development. The child's earliest consciousness is no doubt a mass of touch and muscular sensations, probably experienced to a slight degree prior to birth. He enters a world of light and sound, but can as yet neither see nor hear. These he has to learn. So with the other senses for the most part. Among the more important of the child's native or unlearned reactions, that is, reactions due to inherited capacities, are fear, acquisitiveness, sympathy, curiosity, simple imitation and constructiveness. Through the organization of these instincts in the nervous system there is a sort of pre-established harmony, and even at birth the child and its environment are something of a mutual fit.

In the mind of the child there goes on a process of growth and development. Whilst the mind remains a unity, yet it becomes more and more complex: there takes place what may be called a differentiation of distinguishable but still interconnected phases of mental life. A distinction of importance between mental growth and mental development may here be noted. On the one hand, by mental growth we are to understand an increase in the stock of our mental experience; while by mental development we take into account the elaboration of the materials furnished by experience into more complex forms. It will readily be perceived, therefore, how sense-perception favors mental growth, while imagination and thought favor mental development. Considering the analogy of the seed, we say that it develops into the plant with all its manifold organs, and growth accompanies the development at every stage. In like manner the mind, the self, grows, unfolds, develops. It grows in experience and through experience; and the capacities which are inherent in it from the beginning gradually develop into the various powers of the self-perception, memory, imagination and thought. The mind grows, therefore, in the sense that its experience is increased, it develops according as new capacities and powers are revealed. In normal mental development, therefore, whether in the child or adult, we shall find certain well-marked characteristics: (*a*) an increase in the content of experience, (*b*) an increasing complexity of mental process, (*c*) an increasing power among the various modes of the mind's action, (*d*) increasing facility and adaptability of mental activity, (*e*) an increase in organic unity and solidarity of mind.

There seem to be three general principles controlling the process of mental development, and which must constantly be kept in mind by those who are in any way trying to influence the mental development of others. They are, of course, principles of all mental development. (1) Activity: The genesis of mind takes place through activity or mental struggle. Through activity the mind adjusts itself to the conditions or circumstances in which it finds itself placed. (2) Apperception: This principle simply calls attention to the fact that the mind in the assimilation of new experience brings to bear what it has retained from the past in order to give meaning or significance to the new. (3) Expression: It is through giving to it some form of expression that the impression is fixed in the mind. In the life of mind it may be said that nothing is possessed until it is given away.

In mental development we discover four influences at work: (*a*) natural or fundamental capacity—the capacity, namely, common to all minds to know and feel and will; (*b*) heredity. Men are not born free and equal. One has only to note the limitations ready-made and self-made which hem men in to realize this. Some men enter the race of life handicapped from the start because of baneful inherited tendencies, weak bodies, poor nervous systems and a low supply of vital energy. It may be that in recent years heredity has been somewhat over-emphasized. Some would make the mind's growth wholly pre-determined. They maintain that the course of mental development is exactly determined through the relation of ontogenesis (individual development) to phylogenesis (race development). It may be mentioned that this conception overlooks the fact that the human infant at birth is much more of a potentiality than an actuality—much more unformed and unorganized than is generally thought. It overlooks the significance of the plastic period of infancy—the "dynamic belt of quivering uncertainty" in the individual life. As we ascend in the scale of animal life heredity would seem to play a lessening part, while the importance of environment increases steadily. Again it seems to lose sight of the fact that man is pre-eminently an imitative creature. (3) Physical environment. (4) Social environment. Through the new insight into the meaning and significance of human infancy it has been noted that environment is a factor in the development of the human individual greater than in that of any lower species. The development of the child mind is therefore partly determined and partly self-achieved; partly fated and partly free. Mental development is in part at least self-development or self-determination through environment.

Mental development, moreover, is a unitary process; it is a continuous change; it is a becoming—a process in which, throughout its various stages, we can discern intellectual, emotional and volitional factors, or, better, aspects. These do not work apart; each has an inevitable influence on the others. Writers have divided the course of development of the child mind in various ways. The best summary will be found in Chapter 4 of Chamberlain, "The Child: a Study in the Evolution of Man." Perhaps the most satisfactory attempt to mark off the periods in the mental development of the child is that of Pfisterer. According to this author there are four fairly well-defined stages: (1) Suckling period, in which the physical life and the psychical life, so far as it is manifested through the senses, play the more important part. In this period the child makes use of his inherited capacities, his native reactions. His learning is through trial and the selection and emphasis of accidental successes. Shortly after birth impressions begin to be connected and we have the beginnings of memory. At first only intense stimuli can cause the exercise of association. Taste, on account of its utility, is perhaps the most precocious of the senses. Closely associated with it we find touch and smell. The development of this last sense is exceedingly slow as compared with its development in the animal. The first feelings are closely connected with contact sensations arising in the process of nourishment; indeed, we may say that the child's emotional and intellectual life centres about the process of nutrition. Up to the fourth month his entire life centres about his physical needs. At three months the child will forget his mother in a few days. In response to the brilliant light or loud sound, the child begins to attend about the end of the fourth month, but the attention seems for some time almost wholly reflex and is very spasmodic. Lights, sounds, and movements—movements particularly—play a very important part in the development of attention of this purely reflex sort into that based on interest, however vague it may at first be. The development of attention based on interest seems to go very rapidly forward in the second half of the first year. Associations of sight, touch and muscular sensations assist him in gaining a knowledge of his body. Of course along with this will go a knowledge of other things and their uses. In the second half year—after the eighth or ninth month—the child begins the simple imitations of movements, and later on, of sounds—at first with no improvement. Soon, however, there develops a tendency to persistent imitation, and here will emerges. (2) Childhood from the second to the sixth year. From about the beginning of the second year imitation becomes the child's method of learning, that is of adjustment to situations. Language, writing and the various other accomplishments by means of which he enters on his spiritual inheritance are learned by this method. In this second period we have the beginnings of self-consciousness, although the outer world plays still a quite engrossing part. Curiosity, the instinctive liking for knowing and doing things for their own sake, undergoes a great development, memory and imagination become active and the child attains the rudimentary stage of conception or abstract thought. This is the great period of play. For the child, play trains its senses, imagination and thought, and through social requirements gives self-control in certain directions. It presents new opportunity as well as material for imitation and originality, and becomes a unique form of social preparation, with all that this implies. In this period certain habits of obedience are formed, feeling comes more under control and impulses more organized. (3) Boyhood, from seventh to fourteenth year. We find this period marked by the coming to the surface of individual traits or peculiarities. Self-control is increased, independence in thought and choice, and a growing habit of self-reliance. In this period, also, we find the feelings already developed becoming more complex and the emergence of new ones —intellectual, æsthetic, personal and social. (4) Youth, from fourteenth to twentieth year. In this period the individual increases in self-knowledge and self-reliance, in thought, feeling and action.

Two very important epochs may be noted in the development of the child mind: (*a*) The period when the child, through the emergence of the instinct of locomotion, the free use of the hands and the growth of the teeth, may be said to pass from a state of almost complete dependence to one of comparative independence, the independence increasing until maturity. (*b*) A second epoch-making period is that of puberty or adolescence. This is the individual's second birth, according to Rousseau. Thought, emotion, desire, at this time receive an enormous impetus and expansion. Only the fact, however, can be noted here.

Passing over other phases of the child's mental development which might be noted, did space permit, a word may be said concerning the child's acquisition of language. In this we find three fairly well-defined stages: (*a*) The period of primitive sounds, babblings of a more or less reflex sort, with at times some chance combinations, which are of course selected and emphasized by those about the child. (*b*) The period of imitation, a period in some children beginning before the end of the first year, though occasionally in others not until the latter part of the second year. Through imitation the child is making over its particular environment, and having the chaos of its babblings given form through the assistance of those about it. To such vowels, a, e, u, and so forth, consonants, such as d, p, m, are gradually added, giving the well-known combinations so dear to parents' hearts. (*c*) The period of real thought expression, in which the child becomes interested in the connection between word and idea. The transition from the word as interjection, and as result of imitation, to the word of actual speech has been effected. Through the acquisition of language the child has become able to use the senses of other people as well as his own. A new world has been opened to him—a world of thought, of feeling, of possibility.

In the growth of the sense of agency in the child, Professor Baldwin distinguishes three stages: the projective, the subjective and the ejective. The child notices very early the difference between things at rest and things in motion, the moving curtain, the hand of the mother or nurse. Coupled with this last is a certain feeling-tone. Movement for the child is connected with his pleasures or pains. For a time the central fact in the child's life is the "pain-movement-pleasure" association. The first step in the consciousness of agency is taken when the child notes the difference between persons and things. Gradually persons, for the reason that they represent a peculiar and often times unstable experience for the child, are given a more prominent place than things in the child's consciousness. This projective stage then is the first in the development of the child's sense of personality. Persons at this stage are more interesting and more puzzling than things to the child. Through the child's tendency to imitate anything that arouses his interest, the transition from the projective to the subjective stage is gradually but inevitably effected. The child imitates the copy set by persons in whom he is interested. He sees them try, put forth effort, accomplish. The child imitates, tries and tries again. Putting forth effort he has a glad sense of its efficiency. Effort becomes his resource in difficulties. In his "try and try again" we have the emergence of will, and in his acts of will he learns the reason of effort and tastes its fruits. It will thus be noted how great a part imitation and effort play in the development of the child's sense of personal agency, of self. Self-consciousness is not innate; it is only gradually acquired. The ejective stage develops along with or closely following the subjective. The child learns about the acts of others because he is learning to understand his own. First of all, he became interested in persons, because they puzzled him more than things; he was led to imitate them; he tasted the pleasing fruits of his behavior; understood the reason of his act to a degree; and then "ejects" his sense of self and purpose, thereby understanding those who had hitherto not only interested but puzzled him by their (to him) strange behavior. It will thus be seen how the sense of the *ego* and the *alter* emerge together. Whilst in the child the elements of the sense of personality are present, no one among the children of men will lay claim to complete self-knowledge.

Education Through Play.

By George E. Johnson, University School, Cleveland, Ohio.

EACH new emphasis laid upon the theory of evolution in determining educational principles emphasizes anew the relation of play to education. The recognition of the value of play in education is very ancient, but it is only in recent years that the real dignity and significance of play have been appreciated. Many studies of childhood, Chamberlain's chapter on "The Meaning of Youth and Play," and the work of Groos have added a new dignity and importance to the play of children in the eyes of educators. "Childhood is the period in which, by the eminently supple and attractive instrument of play, the natural instincts and impulses, so exuberant and so far reaching, make possible the normal, healthy, active, ingenious, self-knowing and self-trusting adult. Youth has made possible the passage from the unconsciousness of instinct to the art of civilization, and play survives sufficiently, even in adult life, to prevent this art from degenerating into mere mechanism. Just as helplessness in infancy is the guarantee of adult intellect, play in youth is the guarantee of adult morality and culture. The prolongation of infancy in the human race needed as a corallary the activity of youth to secure the wisdom and strength of mature life. Play may be termed the genius side of intellect, and youth its inspirer. Man had to be young to be civilized; had he no youth and no play he were perpetually a savage."*

James, in his chapter on Instinct, has incidentally thrown light upon the office of play in education. Many instincts, he says, are transient. If, during the period of activity of any instinct, the environment is favorable for its manifestation, a habit is formed which survives after the instinct has faded away; but, if the environment is unfavorable for the manifestation of that instinct, the instinct will soon fade, and no habit will be formed, however favorable the environment may afterwards be. A chicken which has not heard the call of its mother during the first eight or ten days of life, will never give heed to the call. Young ducks kept from the water for a certain period lose their instinct for swimming. Young squirrels confined in cages, failing to find soil in which to bury their uneaten nuts, soon cease all efforts to bury them.

"Leaving the lower animals aside, and turning to human instincts, we see the law of transiency corroborated on the widest scale by the alternation of different interests and passions as human life goes on. . . . . In all pedagogy the great thing is to strike while the iron is hot, and to seize the wave of the pupil's interest in each successive subject before its ebb has come, so that knowledge may be got and a habit of skill acquired—a headway of interest, in short, secured, on which afterwards the individual may float. There is a happy time for fixing skill in drawing, for making boys collectors in natural history, and presently dissectors and botanists; then for initiating them into the harmonies of mechanics and of the wonders of physical and chemical law."*

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*Chamberlain. The Child: A Study of Evolution, p. 27.

"The natural conclusion to draw from this transiency of instincts," says James, "is that most instincts are implanted for the sake of giving rise to habits, and that, this purpose once accomplished, the instincts themselves, as such, have no *raison d'être* in the physical economy and consequently fade away."

This "opportuneness" in education, so well emphasized by James, and further elaborated by Burk, in his study of the development of the nervous system, and by many minor studies of childhood, as summed up in the article by Bryan, "Nascent Stages and Their Pedagogical Significance," bear direct emphasis upon the office of play in education.

The play manifestations of children are the expressions of inherited impulses reacting to environment, and become revealers of child-nature as truly as the instincts and habits of animals tell us of the nature of animals. So far as these impulses are in line of the progress of the race, suitable environment must be provided for their activity, and at the proper period in life, or the child will in some wise fail of fullest development.

It was not, however, the original purpose of this paper to present any extended discussion of the theoretical side of play, but rather to present briefly some practical suggestions relative to "Education through Play."

Education owes, already, a two-fold debt to play. First, for its revelation of child-nature and laws of development; and secondly, for its service as a means of development. I wish to discuss mainly the second of these two offices of play. The first is of great importance, especially as regards the application of the second, yet the teacher, with little suggestion, can avail herself of it by keeping her eyes constantly open wherever children may be found, unhampered by the conventionalities of their elders.

As Groos has said, there are two ways of making use of play in education: First, by introducing the playful into the work. Second, by employing play as a means of development.

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* James. Psychology, Vol. II., p. 400.

The playful element in instruction should not be confused with genuine play. It is by no means unimportant when rightly used. The kindergarten has employed this playful element more than actual play. It has proven of real service in connecting the play of the child with work, as in the kindergarten gifts. Many of the ring games fall short of being real play, the incentive to the activity, which the teacher supposes the child to have, being foreign to the child at that stage of development. Much of the "occupation work" is nearer genuine play, especially when "free." The kindergarten is very wisely introducing free play more and more.

A few concrete examples of the use of the playful element in education may be helpful in making the distinction clear. The history of education furnishes many classical examples of this kind.

Erasmus tells how the ancients "modeled toothsome dainties into the forms of letters, and thus, as it were, made children swallow the alphabet." Comenius used toys and puzzles. The Jesuits made much use of the playful in education. They pitted each boy against some other boy in a kind of intellectual wrestling match, each boy watching for a chance to trip his rival. Frequently sides were chosen, representing hostile camps, called "Rome" and "Carthage," which engaged in pitched battles on some field of Latin grammar or Greek composition. This calls to mind the old-time spelling match, which once, no doubt, proved a source of much pleasure and profit. Locke mentions that an acquaintance pasted letters upon dice, making a game for his children, he winning who threw most words at one cast of the dice, "whereby his eldest son, yet in coats, has played himself into spelling with great eagerness." Quick gives an interesting use of the playful in education in his quotation from "Fred's Journey to Dessau:" "They play at soldiers, and Herr Wolke is officer. He gives the word in Latin and they must do whatever he says. For instance, when he says, '*Claudite oculos,*' they all shut their eyes; when he says, '*Circumspicite,*' they look about them; '*Imitamini sutorem,*' they draw the wax thread like the cobblers. Herr Wolke gives a thousand commands in the drollest fashion. Another game is the 'hiding game.' Someone writes a name and hides it from the children—the name of some part of the body, or of a plant, or animal, or metal—and the children guess what it is. Whoever guesses right, gets an apple or piece of cake. One of the visitors wrote *intestina* and told the children it was a part of the body. Then the guessing began. One guessed *caput*, another *nasus*, another *digiti*, and so forth for a long time; but one of them hit it at last."

Many devices of this nature are in vogue in primary schools.

Number is taught by means of tops, dice, and various other number games. I have seen feeble-minded children delighted with their number lesson, when they were trying to see how many pins they could knock down at one roll of the ball. A child who has no interest in "$3 \times 4 = ?$" is eager to find out the answer when he is trying to "get the most cards." A very good illustration of the playful in physical training is seen in the gymnastic plays devised by Miss Stoneroad. Instead of executing certain set movements, the children play they are snowballing, or that it is Christmas morning and that they are trying their toys, thereby retaining largely the initiative in the form and execution of the movements. Such exercises supply a very useful link between games and formal gymnastics.

The reader will readily recognize that the above-mentioned devices are not strictly play. They are rather "devices" introducing, often very advantageously, the playful element in the work of instruction, and have been employed more or less by teachers, consciously or unconsciously, everywhere. But a more serious and difficult problem confronts us in endeavoring to make systematic use of real play in education. No one questions but that play educates; can play be engrafted successfully into our system of education and still be play?

I have no hesitation in saying that I believe this can be done. The spontaneous plays of children can readily be referred to the instincts which prompt them. During the first years of life play is the natural teacher of the child. Through play he becomes trained in the control and intelligent use of the motor and sensory apparatus of the body, necessary alike for the preservation of the individual and the race. As he gains in stature and power his play conforms to higher activities, through which and by which the race has advanced towards civilization. Some of these activities, now bequeathed to children as instinctive, are construction, imitation, acquisitiveness, emulation, pugnacity, sociability, instinctive counting or tallying, love of music, color, representation, curiosity and discovery, organization, and even seeking for causes and reasoning. The use of these instincts in the work of the school is practicable to a large degree.

In Physical Education play furnishes a wholly adequate training for the normal child. Plays and games are now widely recognized as an essential part of the course in physical training. Lists of games, courses of games, and books of games, for school use are becoming common. The advantage of play over gymnastics is apparent if one cite but a single distinction. While the body may be considered a machine, it is a machine of internal and not external operation. The muscular system has reached its present form and development through movements executed in the accomplishment of some purpose or ideal. The attention has been upon the thing to be accomplished and not on the movement itself. It is thus in the play of children. But in gymnastics the attention centers upon the movement itself, thereby reversing the natural order, destroying the spiritual element, inducing self-consciousness, awkwardness and fatigue.

In selecting games for school children, it will be helpful to bear in mind that the active games of children have developed in the exercise of certain instincts. A vast number of games fall under the following classes:

I. Based on the hunting instinct:
    1. Games of chase, as tag.
    2. Games of searching, as hide and seek.
    3. Games of hurling and throwing, as ring toss.

II. Based on fighting instinct:
    1. Games of contest, as baseball, football.

III. Based on instinct, of emulation, as racing.

The games should be adapted to the development of the child. For example, the play of children under seven years of age differs from the play of children from eight or nine to twelve. The organized game is not natural to children under seven. Free play far more than games should be utilized in the physical training of children of this period. There is scarcely an activity of the race which is not here in miniature. From eight or nine to twelve emulation and interest in organized games steadily increase. Games requiring individual effort and some coöperation may now be used.

The effect of use of play on school work in general is worthy of mention. Teachers who had regularly made use of games in the middle of the afternoon session were unanimous in saying that the games revived the children, gave an added zest to their study, and made the children more quiet and responsive. Tests of amount and accuracy of work done by primary children after the afternoon games showed a decided gain in favor of the use of games.

Very much of the school work in Nature study may be accomplished through play. The instinctive curiosity of children in natural objects and the instincts of hunting and collecting furnish incentives for wide and even systematic knowledge of nature. Much work of this character has been successfully done in the Andover Play School. Nothing could be simpler than to utilize these play interests in gaining a knowledge of the fauna and flora of a given locality. The universal passion of boys for collecting stamps, buttons, cigarette pictures, tobacco tags, and what not, gains in interest and duration when turned upon bugs, butterflies, caterpillars and fishes.

The instinct for construction can be made the motive for constructive work throughout all the grades of school work. Play has its influence here, even when the object made is lacking in specific interest to the child. A boy may make a joint at his bench and enjoy the work, although he has no use for the joint as such. His love of construction makes the exercise pleasurable, and in so far the instruction is based upon play; but when the object made is something that the boy desires for its own sake the play interest is genuine. Just how far manual training may have the genuine play interest and be satisfactory in educational ideal has not yet been determined. That there is a wide application of genuine play interest in manual training has been demonstrated.

The value of play in moral training has often been called to the notice of teachers. If the theory of evolution throws any light upon the education of children, it certainly throws light upon the moral training of children. Virtues vary with the period of development. Unselfishness in a child of three may be a sign of weakness and not of strength. In his play is developed the selfhood of the child. In the play of the boy are developed individuality and sense of personal power, with some sense relation to others. In the games of youth, the individual becomes subordinated to the whole. This selfishness, or self-hood, of the child becomes the basis of the individuality of the adult; the willfulness of the child makes possible the determination, persistence and strong will of the man; the excessive self-confidence and self-praise of the boy become in later life the basis of tempered self-assertion and self-respect; quarrelsomeness, pugnacity, in the boy may develop into that capacity for righteous warfare of the public spirited citizen.

In these and other departments of school work the application of the play interest will depend much upon the adaptation of work to the stage of the child's development. Arithmetic, language, science and history may be made to swing into line with the child's interests and powers. When such is done there is not enough difference between play and work to quarrel about. And the highest type of work is the work which has the largest amount of play in it. The great men of all ages, in every department of life's work, have had this play interest in their work.

Imitation and Suggestion in Mental Development.

By George B. Germann, Columbia University.

AT the outset it becomes necessary to indicate the exact meaning to be assigned in this brief study to the terms suggestion and imitation; for by different psychologists these terms have been accorded a variable significance. Thus M. Tarde, in his brilliant sociological study of the laws of imitation, accords to the term imitation a comprehensive signification, extending it to include phenomena of vibration or repetition in the physical world, phenomena of heredity in the biological realm, as well as the phenomena of copying, either consciously or unconsciously, the activities surrounding the human being in the social environment. Likewise Professor Baldwin's statement that "all organic adaptation in a changing environment is a phenomenon of biological or organic imitation" extends the meaning of the term beyond its commonly accepted significance. In view of the confusion incident to the extension of a well-known term to include phenomena not usually classified within its extent, I have decided for our purposes to limit the meaning of the term imitation to the ordinarily accepted sense, and to apply it specifically to human beings. By imitation I mean the adoption by a person of a thought, a feeling, or a volition suggested by the presence of a similar thought, feeling, or volition in his social environment. The latter series function as presentations or examples which are copied, either consciously or unconsciously. Both the form of activity thus involved, and its resultant, are what I mean by imitation.

In like manner the term suggestion offers a relatively wide range of applicability. It is used, for example, to indicate both the inciting causes and the peculiar modes of activity which induce a person in an abnormal state of trance or hypnosis to assume various mental and bodily manifestations which may differ from the phenomena exhibited in normal life. For our purposes I shall restrict the term suggestion to include the instigating factors or phenomena in the social environment which lead to the adoption, by a person, of a thought, a feeling, or a volition, either originally or for the time being absent from his consciousness.

The mere application of our definitions of the terms suggestion and imitation to concrete cases readily impresses us with the fact of the universal presence of these factors in practically all stages of mental growth and development, and therefore in all stages of the educational process. From the earliest hours of life the infant is surrounded by a host of suggestive influences ready to operate just as soon as the senses get into working order. But the resultant of the operation of suggestion cannot be sensibly perceived by us until some definite response is made in the form of imitative activity, as of muscular movement. However, the eye of reason readily perceives that suggestive influences must be operating even before definite imitative responses appear on the scene. The plasticity of infancy permits these subtle and unconscious influences to mold the young within the limitations imposed by fundamental capacities and hereditary tendencies. Thus it is that Dr. Harris traces all the earlier and many of the later spiritual achievements of infancy in the activity of the imitative instinct. In accordance with this same point of view Aristotle in the Poetics states that "man is the most imitative of animals and makes his first steps in learning by aid of imitation."

Mental growth and development, apart from the operation of suggestion and imitation, in most, if not all, of the earlier stages of life, is unthinkable; with slight modifications, to provide for the work of genius and ultra-radicalism, practically the same statement might be made in regard to the later stages of life. The infant grows into conscious adjustment with his social surroundings by learning to act as others act; by acquiring the language of his civilization; by learning to think in the modes of thought of the society into which he has been born; by acquiring the conventions of his particular social sphere. Only thus can he find opportunity for development. And all this demands the ever present, healthy activity of the imitative instinct. These imitative acquirements become transformed into habits; habits of speech, habits of thought, habits of conduct, habits of feeling, from which the individual later in life may perchance free himself, if he wills, only by setting up in consciousness new ideals which in turn can find expression in action only through the copying of these new patterns; that is, through imitation. Hence we perceive the almost universal presence of the imitative instinct, and the almost universal operation of suggestion, in all phases and stages of mental development. The social fabric is being constantly interwoven with new manifestations of this tendency. Thus, as Prof. Josiah Royce has put it, we know that "virtue and vice are alike, under favorable circumstances, 'catching'; that fashion has, in certain matters, an irresistible sway; that not only commercial panics, and mobs, and 'fads,' but also great reform movements, and disciplined armies, and such historical events as the conversion of nations in the old days from heathenism to Christianity, all illustrate, in their ways, the potency of imitative tendencies; and that art itself, at least according to Aristotle's famous definition, is essentially imitative. We know that there are sometimes epidemics of crime or of suicide. We know that the doleful prevalence of the current popular melody is due, not to a love of music, but to the insistent force of the imitative tendency. Turn, thus, which way we will, the familiar presence of the imitative functions in human life impresses itself upon us.

I shall now consider the natural appearance and gradual growth of the imitative instinct in the infant. The careful observations of Darwin, Perez, Egger, Tiedemann, Baldwin and Preyer would lead one to conclude that the imitative instinct is not definitely manifested until about the fourth month, or somewhat later. Thus Darwin writes: "When our infant was only four months old I thought that he tried to imitate sounds; but I may have deceived myself; for I was not thoroughly convinced that he did so until he was ten months old." Preyer assures us that not until about the end of the fifteenth week did he note evidences of imitation in his boy; and he furthermore states that apparently imitative movements made in the fourth month did not again appear during either the seventh or ninth month. However, Baldwin and Preyer state that during the tenth month imitative movements of various kinds appear in great numbers. Observations of this nature on a few children can lead to no definite generalizations. It is a well-known fact that children differ greatly in regard to their imitative ability, just as there are as great differences among adults. But these authoritative observations do tend to show that the imitative impulse is not functional at birth any more than the reasoning power is, although the instinct may be present, ready to manifest itself on proper occasion and after neural and muscular development have sufficiently progressed. Apparently definite imitative actions, that is, actions which are performed in the presence of a copy a sufficient number of times to eliminate the possibilities of mere chance reactions, do not arise until toward the middle and close of the second half of the first year. And this is what the facts of infancy would, in general, lead us to expect. Every infant born into the world alive is physiologically adjusted to his environment. Psychically he is a pure potentiality, a bundle of reflexes, impulses and instincts. His nervous system is in a high state of unstable equilibrium. His actions are random and uncoördinated, and may proceed either from inner impulses or from some sort of outer stimulus. The active responses thus called forth furnish the occasion for the growth into experience upon which the later appearing imitative action is built. This means that the physical basis for a special activity must exist before that activity can operate. An imitative action cannot occur unless there be present in the child the proper coördination of sense impressions and the proper movements necessary for the performances of that action. Experience and observation teach us that such coördination does not appear until some months after birth, and even then this coördination is of a crude character. Sensory and motor coördinations in the early days of infancy are the natural ends towards which the infant progresses by the processes of development. As the basis for such coördinations we perceive a developing muscular system which gains power of action through the early random movements, a gradual perfection in the terminal sense organs, especially the eye and the ear, and a growth in complexity, both of structure and of function, in the nervous system. These three factors are of coördinate importance. Each develops hand-in-hand with the other two. None is complete without the others. The significance of this becomes readily evident when it is recalled that the essentials of any primary imitative act are (1) that some sort of sensory stimulation be received of sufficient strength that it be transformed into (2) a proper motor reaction, whose resultant is a copy of the original stimulating cause, whether of things seen or of sounds heard.

It will be perceived that imitative actions correspond somewhat to the general reflex type, which is the type to which all instinctive actions conform. Instinct is usually defined as "the faculty of acting in such a way as to produce certain ends, without foresight of the ends and without previous education in the performance." Preyer's child, who, towards the end of the fifteenth week, pursed his lips in apparent response to similar actions made by the father, produced such a result, we may believe, "without foresight of the ends and without previous education in the performance." Such an action as pursing the lips is, however, a very common one among children from an early day, and cannot properly be called imitative. It is a random movement frequently performed and of which they would therefore gain a great deal of experience even before they begin to pay much attention to what is going on about them. But this random experience lays the basis for the growth into proper activity of the organs involved. The power to perform certain actions is thus gradually evolved. Motor coördinations are taking place. Merely time is wanting before a certain visual or auditory stimulus will incite the growing tendency to transform such stimulus into an appropriate imitative action. The time of appearnnce of any usual imitation depends upon the time of development of neural associative paths and of sensory and muscular organs. The important fact to be kept in mind is that the infant is gradually gaining *ability* to imitate, and that this ability must precede the imitative act. But this is not the same as saying that all imitation is, as Bain contends, an acquired characteristic. On the contrary, the imitative tendency is very probably an innate impulse.

To state briefly our conception of the imitative tendency as outlined, we may indicate that it seems to accord most closely with the law of dynamogenesis, which is a formulation to the effect that every mental state manifests itself in a correlative activity of some kind; that consciousness is in its very essence impulsive. Through natural selection man has evolved along lines of greatest use to him. His musculature is a system of this useful character, whether it be in the delicate refinement of laryngeal, facial, or manual musculature, or whether it be in the less delicate, though none the less important, musculature of the trunk. These general characteristics, always subject to modification through congenital variations, are transmitted to offspring through heredity. Now the muscular and nervous systems are potentially systems of activities, merely needing appropriate stimulations to bring about resulting activities. The early cries and aimless movements of the infant are such activities. None the less are the later imitative babblings and gestures of a similar character. In the former case stimuli of some sort are followed by movements which we do not call imitative because they do not correspond to a copy. In the latter case stimuli arising from a copy cause a discharge along appropriate channels, perfected through the earlier unimitative activities, with the effect that the resultant corresponds to the copy. But in either case the essence of the phenomena is the same—activity follows on stimulation. And in imitative activity the discharge is along lines of immediate or remote use to man.

Now imitation may be either (*a*) voluntary, conscious, or (*b*) involuntary, sub-conscious. Illustrations of the former are plentiful; for example, maids carefully copy the mode of dress of their mistresses; children who may be much impressed with a theatrical performance will often take great pains in mimicking that performance. All species of purposeful, definite affectation in speech, manners, or dress are of this class. Equally numerous are examples of the second class. It is quite likely that most, or at least a great many, of the imitations of childhood are of this kind. In truth, the instinctive character of imitation and the apparent lack of any but the most rudimentary reasoning power, would lead us to conclude that practically all of the infant's early imitations are probably sub-conscious or involuntary. He reacts to a copy simply and solely because he cannot help reacting. The constitution of his being compels him to react. If an infant sees others crying or make believe crying, he for no other reason than that supplied by the suggestion quite readily makes the appropriate reaction. If a child perceive an adult make a wry face, he usually falls into a similar, though unconscious, mimetic action. We need but appeal to our adult experience for similar illustrations. Here, although reason, voluntary control, and social bondage have acted to hide many of the earlier phenomena of involuntary or sub-conscious imitation, yet such phenomena exist plentifully. We need but call attention to the immense influence often exercised by a new and better social environment on one who may have been reared amid less favorable surroundings. Unconsciously, though with tremendous force, new manners, new avenues of action, new forms of speech begin to insinuate themselves into an individual's make-up, provided that previous counter-habits have not been too firmly ingrained. At this point we may hint that the educational significance of this imitative tendency of both children and adults is to be found in the fact that imitative reaction if persisted in soon become crystallized into habits, thus forming the groundwork of conduct and character.

It is perhaps a commonplace to remark that when once the imitative instinct has manifested itself in a rigorous fashion at about the tenth month, its subsequent growth is remarkedly rapid. And this is so, probably for the reasons (1) that toward the close of the first year the senses and motor activities of the child are being rapidly coördinated and co-educated, and (2) that at about this period or a little later the child makes a vast stride towards physical independence and the consequent ability to make free use of his hands, which are the results of his assumption of independent walking. The importance of these factors are readily perceived when one considers that the basis for the ability to imitate is now becoming vastly strengthened, that the appropriate channels of discharge are becoming rapidly multiplied, and that free and independent locomotion furnishes the stepping-stones to an entrance into the great world of play, in which the child gives free rein to the play of his imitative instinct in gestures and bodily activities. All this merely emphasizes the thought that ability to imitate must be present before the many occasions which favor imitation can result in the proper response.

It would be interesting to know whether, in general, gestures or sounds are first imitated by children. Some children first manifest the former, others the latter form of imitation. Variations due to individual differences appear here as elsewhere in mental development. An extreme avidity for sound imitation characterizes certain children, while others seem for a long time to be obtuse to suggestions of this kind. Again, there are children who rapidly gain facility in gesture imitation while remaining backward in language acquirement. Peculiar temperamental variations may supply the reasons for these differences.

Perhaps the most interesting and most important imitative tendency manifested by the normal infant is that of articulate language acquirement; interesting from the psychologic and sociologic points of view, and extremely important to the infant as means toward unbinding the fetters of misunderstanding which render him a victim to the misinterpretations of his superiors. This imitative acquirement of language which manifests its earliest definite tendencies toward the close of the first year (Preyer, in the case of his son, places it during the last quarter of the first year) has received its preliminary impetus through the early aimless and later monotonous babblings of the preceding months. Power to articulate arises and increases through these babblings, and associations are established between the coördinations necessary to make a sound and the sound itself as heard. When this coördination has become sufficiently matured, it needs but little more than to have an appropriate sound made by another, in order to produce the necessary responses, responses which become easier and smoother through practice. As Preyer states, "although philologists may still dispute much over the possibility of the origin of language from other sources, nevertheless sound imitation remains without doubt the first and most important factor in the learning of language by the individual." Continuing, he writes that no theory "can shake the fact which everybody may confirm in the case of his own children if he only observes carefully and diligently, that through the repetition of sounds heard the human being comes to associate these arbitrarily with certain definite ideas, in the connection in which they have been heard."

As an immediate consequence of this indisputable fact it follows that formal education in the guise of instruction cannot be considered to be the chief or only factor conducing to the child's growth into the proper use of the language of his civilization. Sound imitation long antedates the processes involved in instruction. Imitation among children is extremely more powerful than instruction. Imitation alone functions spontaneously long before the heightened degree of attention necessary to instruction has been developed. Hence we perceive the necessity for surrounding the child with proper models of accuracy, precision and simplicity in language usage. As a postulate, there arises the common-sense notion of preserving the helpless infant from the rude babblings and idiotic dialect known as baby-talk, which superiors often inflict on him in the crude belief that he can better understand a distorted vernacular than a vernacular pure and undefiled.

None the less interesting than the imitative tendency towards language acquirement, and probably a close second in importance, is the manner in which the child copies the activities of the world about him in the unfolding of his play instinct. While it may be unsettled as to which of the two activities, sound imitation or gesture imitation, normally occurs the earlier, there can probably be no reasonable doubt, if one observe young children, that when once fairly started the gesture imitation, as manifested in play, far outruns both in quantity and in prepotency the tendency to sound imitation, or language acquirement. The child is possessed of energy which makes itself known in some form of activity. In play that activity is indulged in for its own sake; no ulterior purpose hovers before consciousness. But every activity must manifest itself in some form. In very early infancy this activity is random. Later it assumes certain forms, and these forms partake for the most part of the nature of the activities by which the child is surrounded: first, mere simple gesture imitation; then, as the child grows in independence, more complex gestures and actions are imitated. The latter rapidly develop into these peculiar forms of childish activity which common parlance has come to designate as children's plays. All forms of play, as any one may see for himself, are merely manifestations of the child's self-activity within certain limits that have been suggested to him by modes of activity within his environment, or by references to such activity in connection with the tales that he hears. By means of his gesture imitation the child often reveals to us his understanding, or at least vague notion, of what it is beyond his power of articulate expression to make known. Through play he gains a knowledge of rudimentary social activities, and reinforces that knowledge through the power inherent in self-expression. The educative value of this imitative play instinct has been succinctly described by Mr. Russell as follows: "There is thus a language of things and events that speaks to the child, and is understood by him, and intelligently responded to by his imitative acts, long before he is able to comprehend and use conventional speech. Here is an avenue and vehicle of acquisition and expression that antedate even the mother-tongues. And this fact, by the way, suggests the question whether our school teaching does not too soon turn away from this natural and universal language, in which the child shows himself such an adept, and unwisely attempts to replace it with arbitrary and artificial word-signs, a later and more complex acquirement, both in the race and the individual, and one for which the infant's powers are not yet ripe; whether there is not at this age a considerable tract of time wherein, by a simple method of example and imitation, *and mostly in silence*, the child might be taught many things more effectively, with less strain and confusion of mind, than under conditions which involve the usual accompaniment of pedagogical verbiage? In a word, since children are on the alert for things to do, months and years before they have any ear for wordy explanations, could not their first teachers borrow with advantage something from the art of those who instruct the deaf?"

As was previously indicated, the imitative instinct constantly unfolds its presence and evinces its power throughout life. Merely in childhood, before this tendency has become interwoven with greater intelligence and inhibiting habits, is it prepotent. As the child grows in intelligence conscious reason seems in a measure to transform the purely arbitrary imitative instinct. Yet it is to a great extent merely a seeming, and the reason for this apparent change is probably owing to the new species of models which the child imitates. Those models are our manners and customs, the various conventions of civilization, the activities of a vocation, and such like. When the child mimics society in grotesque forms we naturally notice the peculiar interpretations which he presents to us. But when growth in power enables him to copy the forms of society without introducing anything bizarre we usually fail to note the same imitative tendency at work. Yet silently and powerfully it continues at work, adapting a person to his social sphere, and, unless it has eventuated in extreme habituation, perchance enabling him when necessary to rise above his sphere, at least in so far as outward appearances are concerned.

From our preceding analysis and illustrations the educational significance of imitation becomes readily evident. Since the instinct to imitate is on the whole perhaps the most powerful single operating factor in the education of the individual, it follows as a postulate that formal instruction can make but little headway against adverse home or social influences of such a nature that a child inevitably imitates them. The younger the children the more susceptible are they to the suggestive influences of their environment. During the first seven years of life and before the school obtains control of children imitation constitutes the major factor in the development of the intellect. Every child becomes furnished with a workable use of language. Through imitation he is provided with the larger portion of his ideas and habits. The school must build upon these acquirements in the furthering of its instruction. Imitation among children is largely unconscious; but instruction is a thoroughly conscious process, in which both pupil and teacher are active. It is because of this conscious activity on the part of the pupil that some headway may, in part, be made by instruction against the tendency to imitate adverse influences. But such instruction can appeal powerfully only to older pupils, who through aroused interests and newer intellectual sympathies are enabled to construct ideals which furnish powerful motives to will-action. The younger children remain highly susceptible to the influences of models. Hence in many respects the school can merely hope to counteract the adverse influences of certain models by setting up other favorable and more powerful models for imitation, whether those models be of language, of courtesy, of considerateness, of punctuality, of neatness, and others of similar nature. And these models may at times really gain in weight over models to which the child has been habituated, because of their newness and attractiveness in arousing curiosity and in stimulating a receptive intellect to action in copying the new models.

Every teacher of experience can recall instances of the redemption of apparently hopeless cases through the operation of sympathy for the wayward. Sympathy is probably the strongest factor in securing the operation of favorable and powerful models. A child copies the inflections, gestures, modes of speech, and therefore, unconsciously, the models of thought of those for whom he entertains reverence and respect. Where sympathy is lacking in the teacher there instruction often works at cross-purposes. Hence the necessity of the teacher's living what he wishes his pupils to live; of enforcing precept by personal example; of doing all in his power to acquire a broad and rich personality. For it is not to be denied that under proper conditions the teacher, whether in the home or in the school, stands to the child in the relation of the spiritual superior to the spiritual inferior. And it is a fact supported by observation that the inferior imitates the superior, consciously and unconsciously.

As the child grows older and the intellect becomes enriched, the point of objective reference of imitation shifts from the relatively external to the relatively internal; that is, ideals of conduct and of character become of greater worth as compared with purely external social suggestions. In this we perceive the great value of stories of adventure possessing ethical content, of the lives of heroes, of the epics, of history, of good literature in general. Literature, history and biography furnish models that have been an incentive to hosts of youth who have been powerfully assisted towards rational living through their endeavors to live up to the high motives revealed in the characters of former men of worth.

One peculiar fact of interest remains to be mentioned in regard to suggestion. Dr. Sidis's experiments on normal suggestion seem to prove quite conclusively that under normal conditions a person will respond to a suggestion in an inverse ratio to the directness with which the suggestion may be given. Our classroom experience with the young furnishes many illustrations of this law. A sulky child's confidence is regained more readily through means not perceived by him than through means readily perceived. Even we adults prefer to believe that we attain to ripe conclusions or to rational activities through our own wills, rather than through the directions of others. This apparent contrariness of human nature may be in some measure due to the human being's natural delight in gaining mastery, in independence of action. The application of this law of normal suggestion to many educational processes is self-evident.

It must not be thought, however, that the imitative tendency is wholly antagonistic to the play of one's individual initiative. The imitative instinct is not thus wholly antagonistic. Rather is it the basis for the operation of one's initiative. Invention and discovery, while the fruits of genius, are nevertheless but extensions of previous inventions and discoveries upon which the inventor or discoverer bases his own contributions. Each one may contribute his mite to the advancement of science or the arts. Yet before he can contribute that unit he must possess knowledge of what has preceded. Upon the basis of the models furnished by previous thoughts and contrivances he constructs his own modification or extension. This assimilation, or imitation, of the experience of previous generations constitutes the basis for progress.

We thus perceive that imitation in the individual progresses from a series of reflexes accompanied by very small or perchance no elements of full consciousness to a series of voluntary actions which are instigated by fully conscious intellectual elements; that the progress is from the purely external to internal models; that reactions on mere presentations precede reactions on representations. From these considerations new interpretations may be placed upon the validity and power of introducing the art element in the construction of our school-houses; of attempting to secure closer and more rational co-operation between the school as an institution and the community in which the school is situated. Above all, it must be clear that the school is but one element conducing to education, and that all the various social factors and agencies are equally important constituent elements in education.

Our specific knowledge concerning some of the most important aspects of the imitative instinct is very sparse. We need still to know much more than is now at our command how imitation acts in the presence of different and competing models: how such a choice is unconsciously made; how such a choice operates between various models of attractiveness; how long a time is necessary to obliterate one sort of imitation by another; what may be the relative potencies of various models. Above all, one must bear in mind that imitation is essentially social in character, which characteristic lends to the preservation of society, since social imitation is the conservative social force.

Adolescence—A Brief Consideration of Its Physiology, Morbidity, and School Management.

By L. E. La Fétra, Lecturer on Physiological Pedagogics, N. Y. University School of Pedagogy; Assistant in Pediatrics, N. Y. Polyclinic Medical School; Assistant Visiting Physician, Randall's Island Hospitals.

PHYSIOLOGY OF ADOLESCENCE.

ADOLESCENCE is the Elizabethan period of human existence. Rousseau likens it to the Renaissance—the first birth being that of the body, this second birth that of the soul, the personality. Concretely, adolescence is the period of transition from the immature boy or girl to the physiologically competent man or woman. The term as here used includes "puberty" and the years subsequent, up to bodily maturity—roughly the second decade of life. Puberty is the age when the special sex life of the male or female first manifests itself; it occupies the first two or three years of adolescence. The later and longer part of adolescence are the years during which the respective reproductive systems attain their full functional power and bodily growth becomes complete.

During infancy and childhood the energies of the body have been occupied solely with the task of individual nutrition and growth. But now there is an additional task; for there comes into activity a system of organs whose purpose is the continued existence and early nutrition of the race. The struggle for mere individual existence has proved overwhelming for many of those that entered the strife at birth; natural selection has therefore already made a choice of those that are to go through the stress and dangers of this second birth.

Up to this time there has been very little difference between the boy and girl of the same age. They enter the period practically alike in bodily structure and mental traits. Romping, joyous animals they play together with no restraint. About the only difference is that the boys are stronger and more boisterous than the girls; consequently they enjoy the rougher and more active play. The years immediately preceding and including puberty are marked in both sexes by an added stimulus to growth in height and weight. This continues from three to five years, and is followed by slower growth during the latter part of adolescence, so that stature and weight then increase gradually up to the twentieth or twenty-fifth year. The final adult stature depends on the growth during this period of pubertal acceleration: any check at this time is irremediable. Dr. Porter of Harvard has shown also that, for pupils *of the same age*, the taller and heavier take a higher rank in school than those poorly developed. The girls reach the age of puberty from one and a half to two years before the boys. Then come years of rapid change in the girls, followed by years of less rapid change in the boys; so that when the two sexes complete the period of adolescence they are entirely differentiated from children and from each other. Bodily structure, physical appearance, voice, manner, thought and feeling—all have become transformed.

The nervous system also shares this wonderful stimulus to growth. Certain convolutions of the brain, particularly those near the centres for smell and touch, and the lumbar enlargement of the spinal cord increase in size. "Vast tracts of brain tissue"—as Clouston says—lying fallow until now are stirred into activity and productiveness. This cannot take place without great risk to the mental and moral functions. All the sympathetic nerve trunks and blood vessels passing to the reproductive organs become enlarged. Probably the changes in the brain and spinal cord are rather an increasing complexity and elaboration than increase merely in bulk. The connections of the nerve cells one with another become more intimate and widespread, so that all parts of the body are in closer touch, and the nervous system is more receptive, more responsive.

The complete transformation is repeated before our eyes so frequently that only by particular study can we appreciate how great a miracle is constantly being enacted.

PSYCHOLOGY OF ADOLESCENCE.

During infancy and childhood the mind as well as the body has been acquisitive, non-productive: during adolescence both body and mind acquire the capacity of production. The changes that take place in emotional and intellectual life are no less striking than those in bodily structure already mentioned. In fact the most prominent features of the psychology of adolescence is the predominance of the emotions. As these new feelings and vague longings increase in strength and number, the mental equilibrium is made unstable, and youth views everything through an emotional haze—as if by moonlght. Moods are very strong—joy, hate, self-sacrifice or selfishness—and the manner is rash, impetuous or enthusiastic. On this early part of adolescence may be "characterized," says Mandsley, "by large vague enthusiasms, dreamy sadness, a brooding want and a not altogether unpleasing melancholy, . . . so there spring up ideal forms in the domain of love and religion." Hamlet is one type; Lafayette another; Joan of Arc another. The growing boy or girl becomes introspective, and is only too willing to obey the injunction "know thyself."

Both the physical and mental life are the objects of this introspection, and great care must be taken lest the boy or girl becomes morbid and hypochondriac. If the self-study is normal there is developed the perception of one's own personality, then self-respect, next recognition of and regard for the rights of others. Social sense develops later. The idea of the beautiful early comes into prominence, being closely related to the emotions. At first physical beauty, of the eye as seen in mankind, in Nature, in painting and sculpture, then the beauty perceived by the other senses—as music—and finally, the expansion of the idea to include the realms of intellect and morals. Love of art, love of truth and love of goodness are outgrowths of the enthusiasm for the beautiful. The growth of ethical nature is likewise closely related to the feelings.

Thus it is that with the beginnings of sexual life the emotions are awakened from their dormant state; they increase in power and diversity and soon become dominant. Their activities stimulate the intellectual side of the mind, and deep, broad, intellectual interests take root and inspiration from the emotional life of adolescence. It must be kept in mind that the higher cognitive powers—judgment, reasoning and will—can go on developing until the fortieth year. In normal individuals whose emotions are properly guided the cognitive powers thus set agoing will continue their activities with pleasure and increasing vigor, so that the emotions become transformed into permanent intellectual interests.

Meanwhile there is a divergence in the lines of mental growth most marked as between the two sexes, but present even in individuals of the same sex. The normal result is the masculine type of mind for the boy and the feminine type for the girl. These types are produced rather by a difference in the degree of development of various parts of the brain than a difference in the kind of development. The feminine mind is more sensitive, more sentimental, has more sympathy and pity; in it imagination and the moral and religious impulses are more powerful. Love of family, love of home, gentleness to the weak, the sick or the aged are especially prominent. On the other hand, the masculine type of mind is characterized by its independence, courage, patriotism, love of the strong and heroic, by the stronger development of reflection and judgment.

As a result of the physical and mental changes taking place during adolescence there is a great change in the manners of the growing boy and girl. The romping tendency becomes subdued in the presence of the opposite sex; bashfulness overtakes the boy to be replaced by gallantry and desire for young women's society. The girl becomes shy at first; then modestly retiring, but gains the ease of womanly reserve and dignity long before the boy reaches the equipoise of manhood.

As adolescence progresses the intellect gains in strength, and finally becomes the mental governor, modifying or controlling the impulses as well as storing the mind with concepts and judgments. Of course, some individuals are a long time in reaching this stage of development: they are termed "emotional." Moreover, the feminine type of mind tends to give greater weight to the emotions. But, however perfect the development, the emotions are always the motive power that set the intellect or the will to work. How sedulously, then, should the emotions be guarded and guided during this thin nascent period! Strong emotions guided and controlled make for lasting moral and intellectual power.

MORBIDITY OF ADOLESCENCE.

It is a fundamental law of biology that any period of rapid development or tissue change is a period of instability and danger for the organs undergoing such change. There is unusual opportunity for undergrowth, overgrowth or misarrangement of some of the developing cells. The multiplying cells may fail to take the proper arrangement with relation to each other, or to the nerves or blood vessels, and so may develop into tumors, or be cut off from their nutrition or from communication with the rest of the body. Moreover, the cells are at such time peculiarly susceptible to influences outside themselves, such as nerve commands, physical shocks, and chemical irritants or stimuli circulating in the blood. If the blood is "thin" the cells are apt to be ill-nourished, and this malnutrition is especially apt to occur if these cells that are trying to grow and form new connections are compelled to use up their energies and their food in doing work which they do not undertake spontaneously. In the development of the body there is an optimum time for everything—a time for growth of bone, another for coordination of muscular action and various times for development of different faculties in the brain. If these "nascent periods," when the particular development naturally takes place, are neglected or abused, no amount of care or training can ever make up for the lost opportunity. There is a certain time for the cells to grow, and a later time for them to perform their higher functions: if activity is urged, growth and development are stopped almost wholly.

The intrinsic energy of the cells should not be diverted from their inherited and evolutionary lines of growth and development; for this is the time when these changes are more important than any other activity of the cell. No such favorable condition for development occurs again. The stunted bodies and dwarfed minds of child-workers in the mines and factories are sad testimonials to the truth of this principle. Again, the cells being in an unstable condition, react easily to outside stimulation, and store up memories of activities: if frequently repeated they persist in the nervous mechanism of the cells as habits. Thus, overworking of the cells may produce two evil results—failure of development and premature cell-habits—which militate against full rounded growth of all the organs and faculties.

In adolescence the organs undergoing most rapid cellular change are those of the reproductive system and the nervous system, including the brain. On account of the great need of nutritive building material, the circulatory and digestive systems also are compelled to do vastly more work. Hence it is that disorders and diseases of these four systems of organs are very frequent during adolescence.

DISORDERS AND DISEASES OF THE NERVOUS SYSTEM AND BRAIN.

The instability of adolescence shows itself in the nervous system as an increased impressibility or irritability. With a proper amount of nourishing food, sleep, exercise and mental work, this may be deemed a normal condition of adolescence. But any lack of nutrition or excess of physical labor may tip the scale and change the normal irritability into an abnormal nervousness. In estimating the amount of work to constitute excess one must keep in mind that mental effort is far more exhausting than muscular exercise. The nerve cell is the highest type of organized tissue in the body; it requires the most complex kind of nourishment to be replenished when fatigued, and therefore mental labor is twice as much of a drain on the energies as muscular or bodily work. The day laborer working ten or twelve hours requires no more rest than the professional laborer after five or six hours' work. And yet both physical and mental labor are necessary to growth of the mind.

From an abnormal nervousness it is only a short downward step to St. Vitus's dance or to neurasthenia and nervous prostration. This applies, I find, not only to the pupils but to the teachers in the school as well. Fatigue of mind and of body occur more readily during adolescence. Within limits fatigue is helpful and aids development. When, however, application is continued only with a painful sense of determination, the fatigue is harmful; the individual is "working on his nerve," and there will be a compulsory reaction or nerve collapse. Loss of the ability to feel fatigue is a sign only shortly removed from nervous prostration. Other signs of fatigue are: recurrent headaches, nervous twitchings, flushing of the cheeks, and uncontrollable outbreaks of laughing or crying. Hysteria and St. Vitus's dance are frequent results of fatigue in ill-nourished or anæmic boys and girls. Of one thousand cases of hysteria studied, fifty per cent. occurred in individuals between twelve and twenty years of age.

Morbid introspection into the physical or mental life may lead to hypochondriasis or melancholia. If the moral emotions are overactive at the same time, the "New England conscience" may be developed, making the individual utterly miserable for months or years. There may be a religious type of melancholia, with dread of having committed the unpardonable sin. Conversions are apt to take place at this time or calls to enter the ministry, convent or sisterhood. At times the melancholia may be so profound that a suicidal tendency is observed. Every year, for trivial causes, several students of both sexes commit suicide. Fear of some terrible disease or of early decay is one type (hypochondriasis), and this is exaggerated through the agency of quack advertisements and pamphlets read by the apprehensive boy or girl.

Where the heredity is neurotic, alcoholic or tuberculous, epilepsy may first show itself during adolescence. Of 1450 cases observed by Gowers more than half arose during the fifteenth and and sixteenth years. Adolescents are peculiarly liable to insanity of various forms, and especially if the family antecedents were neurotic. In some the repression of natural cravings is a strain, and bad habits add to the danger of nervous disease.

All the above nervous disturbances are more apt to take place during the rhythmic periods of lowered physical tone or times of mental strain. Fortunately, only the dark side of the picture is presented here. Nature always tends to the normal, and with relaxation of the school tension many of the lesser disorders disappear entirely. Should symptoms persist, the pupil should not be permitted to remain in school.

DISORDERS IN THE CIRCULATORY AND DIGESTIVE SYSTEMS.

Anæmia, or "green sickness," is especially frequent among girls. The characteristic pallor means that the blood is poor in nutritive elements and that therefore the nerve cells are not being sufficiently nourished. Evidently, demands on the brain should be diminished, and out of door recreation encouraged.

Nose bleeds, palpitation of the heart and shortness of breath are other symptoms, usually of anæmia, but at times of beginning heart disease.

Dyspepsia and constipation are the usual digestive disorders. Hurried unmasticated meals, the rush to school, and cold luncheons are responsible for the greatest number of cases. Lack of outdoor sport is another factor. Neglect to respond promptly to the calls of Nature—especially in schools where both sexes are present—is another cause. Both these digestive disturbances are factors in causing anæmia, and may be predisposing cause of all the disorders mentioned in this paper.

In regard to all the minor disturbances and diseases, it should be repeated that Nature tends to right them if only the organs affected are given a rest, so that their energies can be directed to reconstruction. Give Nature a chance: no one could expect a boiler to be repaired while it is making steam.

THE SCHOOL MANAGEMENT OF ADOLESCENCE.

A thoughtful consideration of what has preceded will, I believe, enforce the conclusion that the especial aims during this period should be two—physical health and mental inspiration. The teacher and the principal must take a broad view, keeping in mind the probable condition of these pupils ten or fifteen years later. The conspicuous physical advances normally made during adolescence are growth in stature and development of the whole reproductive system: the conspicuous mental advances normally made are the development first of the emotions, later of judgment, reason and will. Successful management must assist Nature along these normal lines. The strenuous attempt to make the curricula of adolescence round out the intellectual development should be abandoned. Evolution of each individual's mind is a slow process, and cannot be completed either in school or in college: full development should not be attained until about the fortieth year, or later. The goal is not the production of intellectual phenomena, but able-bodied, well-balanced citizens, capable of assuming all the privileges and performing all the varied duties of manhood and womanhood.

From a survey of the courses and hours of class room work in our secondary schools and colleges, it must be evident to an unprejudiced observer that these courses were devised as best adapted to the needs of the average growing boy, and that the growing girl has been largely disregarded. The plea for equal educational advantages has been thought to mean identical education. This scheme may have been a success intellectually; but it has proved a failure physically. Boys will have their outdoor sports in spite of their studies; girls will pursue their studies in spite of their ordinary need of physical exercise, and in spite of the periodical extraordinary demand for physical and mental rest. Coeducation after the twelfth year is a mistake: better results for the race can be obtained by different systems adapted to each. Certain changes, then, of school management are necessary—mostly for the sake of our girls, but advantageous to many boys as well.

As to Health.

The motto should be "Give Nature a Chance!" The body should be allowed to grow according to each individual's heredity. This is the period for growth: there is abundance of time later for the storing and the maturing of the mind. Every condition that conduces to health should be secured, as far as the means and intelligence of the parents will permit. Simple, nutritious food, eight to ten hours of uninterrupted sleep, properly ventilated bedrooms, facilities for and encouragement to the daily bath—all these must be furnished at home. Furthermore, boys and girls should be taught by their parents the meaning and immense importance of the marvelous changes taking place in their bodies and their feelings.

At the school ample provision should be made for a warm luncheon, and for outdoor sports, or for gymnasium work if the former is impossible. This period is one of great individualization, and calls for a wide range of elasticity in management. While mortality is low, morbidity is high, unbalanced physical development being the great predisposing factor. If excessive development in height and weight overtax the organs of nutritive supply, vital bankruptcy is easily produced by overwork of any kind. There should be five or ten-minute intermissions between the forty-five-minute recitation periods, and the rooms should be aired during the interval. The latter part of the morning should be devoted to studies requiring most concentration, and there should be no more than two recitation periods after the midday recess. During the afternoon every pupil should be required, as part of the school work, to give one or two hours to some field game or appropriate gymnastic work. Visits to parks or museums are not entitled to equal credit.

Girls should be permitted, on written request of the mother, to absent themselves without discredit for two or three days every four weeks; or to be excused from the more taxing recitations and from the required physical training.

Adjustment of Studies.

Something has already been said about the recitation hours; it should be added here that during the early part of adolescence no more night study at home should be required than an hour or an hour and a half. During the latter part of the period, when growth is nearly complete and when the intellect is becoming strong, the amount of home study can be safely increased to two or three hours, part of which should be done in the afternoon.

The fostering of right feelings and the guiding of the emotions are more important during early adolescence than intellectual drill. Inspiration is of far greater value than information. Many a teacher is honored and revered, not for the information imparted, but for the inspiration given. With enthusiasm and interest aroused and directed, intellectual effort is easy and effective. Of course the two sexes, and individuals of the same sex, have different capacities for brain growth and different lines of development, so that one should expect progress to be likewise unequal and in divergent lines.

In the realm of morals the emotions should be guided, and right feelings in regard to one's self, one's schoolmates, one's city and country should be fostered through the medium of history, civics and biology. In the realm of æsthetics and religion, the impulses must be either encouraged—or more often restrained.

In the intellectual realm every effort should be made to broaden the pupil's interest, and as far as possible the inductive method should be pursued with each study. In regard to secondary school studies Prof. Nicholas Murray Butler says the following: [They] "must in the first place be comparative and reflective in character in order to provide for the newly discovered intellectual capacities; in the second place they must be and continue to become more and more difficult, in order to occupy and develop the augmented nervous and mental energy that now presents itself; and, in the third place, the tendency to introspection and analysis must be satisfied by the disclosing of the inner connection and deeper reason of the subjects taught." In a word the teacher's constant thought should be, "*not instruction, but inspiration; not knowledge, but understanding.*"

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The Education of the Feelings.

By David S. Snedden, Department of Education, Stanford University, California.

AMONG the most welcome changes in educational ideals of recent years is that which makes power instead of knowledge the chief end of educational effort. Educators are coming to recognize that knowledge, however useful as a means, cannot safely be made an end of education. It is to this new point of view that we may attribute the interest which is at present being taken in the education of the feelings. In the older education these were taken but little into account. It seemed to teachers that the emotions stood in the way of that intellectual training which they were so anxious to give, and, as a consequence, in many cases the feelings were neglected, perverted or stifled. "Facts alone are wanted in life. Plant nothing else, and root out everything else," said Mr. Gradgrind. In practice we still find too great attention paid to the training of the intellect and too little to the cultivation of the feelings. While intellect must always be the safe guide of action, we must learn that action does not come without feeling, and that in the cultivation of the feelings lies one of the best fields for training in right action. In the education of the feelings to-day our schools are as helpless and insufficient as was the state of barbarism for intellectual training.

The feelings provide an atmosphere in which will and intellect are active. Biologically the feelings are more primitive than will or intellect. No act of an organism of the animal world but has its source in feeling; and likewise there is no act which is not accompanied by feeling. It is sometimes maintained that the feelings are beyond the reach of education; but common sense tells us that directed exercise of the instincts, through control of the environment, through information of the intellect, the feelings are to a great degree within reach of the educational process. In fact it is quite impossible to deal with the child in any way without having a more or less permanent effect on his feelings. No act in the daily routine of home, or school, or community but produces some result in the feelings of every child who comes into contact with it. This being obviously true, it is evident that a conscious control can be exercised over the life of the child in such a way as to permanently modify his entire emotional nature.

We could not undertake here to give an analysis of the feelings, even if psychologists had arrived at a satisfactory analysis. But it will not be inappropriate to show that there is a great range of feelings standing in varying relations to the educational process. There are feelings which belong to the vegetative side of the human organism, as the desires for rest, nourishment, action and the other bodily pains and pleasures. Then there are the more complex feelings of a higher stage, which are still egoistic in their nature. These are indicated by such emotions as fear, grief, anger, enthusiasm, etc. With still higher development these may partake of altruistic qualities, as where fear may be for others or anger be of the "righteous" kind. Beyond these we find the higher social feelings, embracing those commonly called altruistic. These may be represented by the emotions of sympathy, love, generosity and patriotism. There remains, finally, the group of feelings which Ribot calls "disinterested." These may be represented by the æsthetic and intellectual emotions. It is evident that this classification cannot be called distinct or final, yet it may help us in considering the education of the feelings.

It is perfectly obvious that most of the feelings mentioned above have a greater or less degree of foundation in instinct; and that the more primitive feelings are, when not greatly affected by education, the most deeply rooted. In the natural state the desires for rest, for nourishment, and the rest are so necessary to the preservation of life that natural selection has left them very strong indeed. But the individualistic emotions, as fear and anger, also have deep foundations in instinct. As compared with these, the altruistic feelings, however strong they may become through assiduous cultivation, seem to have relatively little basis in instinct. Indeed, Lester F. Ward, as a result of his studies, concludes that man is not, naturally, one of the social animals; and, as a consequence, that very few of his social qualities have any foundation in instinct. Passing to the emotions that rank still higher, it seems doubtful if the æsthetic and intellectual feelings have more than a small part of their source in the instinctive equipment of the human being. These facts are of the utmost importance in the education of the young; for, since the whole trend of social life is away from the dominance of the individualistic feelings, and towards the prominence of the social, æsthetic and intellectual, it becomes desirable to know what and how strong is the native tendency towards each.

Further reflection will convince us that all acts of human life are the outcome of conflicts of feeling. All individual and race progress, after social life has begun, consists of a series of compromises between individualistic and social feelings and responses to feelings. Hence, in a broad way, all education of the feelings must be in the direction of strengthening those which make for individual power without giving emphasis to the anti-social elements; in modifying or repressing those that are peculiarly anti-social; and especially in cultivating those that make for social solidarity, but without unduly weakening the individual.

The educator must take these facts into consideration. The feelings that we call the highest are the most unstable because least deeply rooted in instinct, less native to the soil wherein they grow. They are like the rare orchids of the gardens for which the soil must be elaborately prepared; while the feelings that we call the lower, however desirable and essential, resemble more the hardier native plants, ready to spring up of themselves and requiring little care. Under normal conditions the latter seem to require little cultivation, except in the way of limiting their expression to fields combining usefulness to the individual and, at least, harmlessness to society. The older education made many mistakes in its attempts to suppress the egoistic feelings. It seems to be the rule that the suppression of an instinct either greatly detracts from the efficiency of the individual or produces abnormal variations. Instincts cannot be rooted out, but they may have their expression put under control, diverted, or supplanted by the expression of other and more helpful ones. Our modern educational ideals, in their higher form, seem to involve the truer conception that the way to remove the undesirable results of the egoistic feelings is to gradually control and divert their expression, at the same time that constant encouragement is held out for the development and expression of the less native but more profitable tendencies. Experience seems to demonstrate that any set of feelings loses in force in proportion as the energy which once finds expression in that direction is diverted elsewhere; and it is equally certain that use is the most prominent factor in the development of the higher feelings.

The positive education of the higher sentiments is one of the most difficult and at the same time one of the most important of present pedagogical problems. The social conditions of the time make imperative demand for more effective education for social usefulness; and it can easily be shown that our social intelligence to-day far exceeds the response made to that intelligence by feeling. How to obtain what Dr. Howerth calls the social good-will and social habit in greater measure than is the case at present is a vital question in all civic education. It is also easily seen that the field for the cultivation of what have been called the disinterested emotions is very great in our modern civilization. It seems to the writer that, as agencies which have hitherto been active lose their efficacy, upon the public school as the central agency will more and more devolve the duty of making provision for the education of these higher feelings.

In this connection two facts are worthy of note. The education of the higher feelings must be largely through the formation of numerous and pleasurable associations. They do not arise from or through mere knowledge, especially with the young. A review of the sources of our own best social feelings, and of our æsthetic and intellectual emotions will convince us of this. It is true that the power of suggestion is strong in this direction; but on analysis it will be found that the source from which the suggestion comes is of more importance than the character of the suggestion. The child yields naturally to authority, and his most permanent moral characteristics are probably derived from the association of his actions with the approval or disapproval of his exemplars. So it seems to be also with the æsthetic and intellectual emotions. They have their source, not in any inherited equipment (except in the general predisposition), but in the form of a network of associations with persons and things that have been a source of pleasure. The love of virtue itself finds its deepest source in the contact with the virtuous whom we have come to love.

In the second place, it is to be remembered that all teaching looking to the awakening of the desirable feelings becomes effective only in proportion as it finds present functioning in action. The child to whom the social virtues have been suggested by literature or art should be provided with the opportunity to practice these virtues and helped along the way, otherwise the seed has fallen on barren soil. We have many sources from which we can draw materials that will arouse the nobler feelings in the souls of the young; but if we are unable to direct the expression of these feelings, our efforts are apt to be wasted.

It is for this reason that so much of teaching by precept fails in developing character. The precepts may, and frequently do, arouse the appropriate response; but the feeling thus awakened finds no fruition in present action and soon wastes away. In these times of general education we are learning with pained surprise that intellectual training does not always result in valuable character. We shall probably find that too much of our intellectual education has not been properly associated with sympathetic response from the feelings, and that we have been especially negligent in providing for present instead of remote expression of both knowledge and feeling in action. It often seems hard for us to explain the development of intellect and feelings which has taken place in those not subjected to the training of our schools; but may not the character of a Franklin or a Lincoln be largely due to the fact that in the rugged schools of experience in which they learned every lesson was at once followed by its application?

From this discussion, it is evident that many conditions enter into the education of the feelings. Perhaps the physical environment of the child should be noted first. If that be of such a nature as to throw him back in great degree upon his own sensations, it results in the intensification of primitive instincts and their accompanying feelings. Bodily discomfort, lack of nourishment, sickness—these, we all know, are unfavorable to the growth of the better social or other emotions. Some one has said that it is a sin against nature to preach Christianity to a hungry man; it is certainly not less difficult to awaken love of beauty in the tired and sleepy child from an ill-kept home. Of course some exception must be made to the above from the fact that a certain measure of personal suffering often seems necessary to awaken a proper appreciation of the pain of others, without which sympathy is imperfect. But in general it is true that a considerable degree of comfort is necessary in vegetative being before the more subtle emotions can come into play. To the thoughtful teacher this aspect of our problem will be very suggestive.

The second consideration for the practical teacher is to note the effect of ideals. These have their beginnings very early in life. The strongest ones always have their source in real life, much as we may sometimes think to the contrary. Father and mother, relatives, teachers, friends, playmates—these people the world whence comes the child's ideals that act upon his feelings. The inherited stock of social feeling is vague; but in its development it responds freely to the world of living beings about. Later on, upon this foundation, we may build other and more rarified ideals from the literature, history, mythology, and art that are becoming so available.

But it is of greatest importance that these ideals be objectified in life, and that, too, in the present rather than in the remote future. Some one has said that wisdom consists in knowing what to do next and virtue consists in doing it. In order that character may result the child must live into action his ideals, or at least strive to do so; his feelings must be "set" by use before they have fruitlessly evaporated. The child who can at school enter sympathetically into the emotions of some character in literature and then proceed to act selfishly towards a playmate is in as bad a way as the fashionable theatre-goer who can weep with the hero of the play at the same time that her coachman is freezing to death outside. In the regulation of the life which children lead with their associates—at home, at school and in the community—lies the best source of the education of the higher feelings, for it is here that the world of reality finds expression for the children. Here feelings grow or fade away according as they find or do not find realization in action. Children associating only with each other tend to reach a common level which is but little above barbarism. Only from above can they derive the inspiration that leads to elevation of feeling and action. Hence parents and teachers stand not only as exemplars but as conscious guides towards the young. In the well-conducted home, while free scope is given to the activities of childhood, there is always apparent the control which imposes a weight of resistance, slight at first, but steadily increasing against the expression of feelings which it is undesirable to intensify; and there is equally the deliberate, though perhaps invisible, inducement to evoke the higher sentiments and to fix them in habit. The state of affairs in which these conditions are reversed is known to us all.

The school as an isolated institution cannot wholly correct the defective training of the home; but when it combines in the community the atmosphere of a notable social institution and the personality of strong teachers it can do much to set in motion new educational forces. It is no insignificant fact in educational history that so great a demand is made at the present time for winning "personality" in the teacher. We shall eventually learn that it is of more importance to childhood that a teacher be able to stand a good examination in personality than in the subjects she teaches. The teacher who is a perpetual source of inspiration to high thought and feeling in the young, who works in a school that is no mere house, but a community institution, esteemed as such, will act as a persistent restrainer of the undesirable in feelings. She will guide strong impulses into right lines of expression. She will create new lines of expression which will lead to new and higher sympathies. From the teeming materials of the civilization about her she will gather an abundant store to call into being and to develop the more beautiful sentiments. All of this is possible even now, and frequently realized where American education has reached its present high-water mark.

But if we could add to this such conditions as would make it possible for equally gifted teachers and leaders to be near the children during playtime and through vacation, how much more could be accomplished. And beyond this still, if we had such cooperation between school and home and church and street that the entire waking time of the child might be spent in the midst of the real activities of life, and yet away from the elements of corrosion, what might not be the result! These things are not wholly dreams. It would require no very great elaboration of our public school system to make much of all this possible. An awakening of the civic spirit, a popular appreciation of the meaning of education, and somewhat increased support would tend to bring these conditions about. But only then will anything like a complete education of the feelings be possible.

Character, Instinct and Instruction.

By Charles C. Van Liew, President State Normal School, Chico, Cal.

SINCE the infusion of certain Herbartian strains into educational thought and discussion in America, there has been more or less said and written concerning "Instruction that Makes for Character," and at the same time there has always been more or less doubt expressed as to the possibility of any such instruction. This doubt has been based in the main on two propositions: First, that character in at least some of its best, most forcible reactions is native, innate, rather than acquired; second, that for the rest, character is a matter of unconscious intuition, of sub-consciously established habits which are neither directly assailable nor creatable through the medium of ideas. Leaving the question as to whether these two propositions are valid in their full sweep for future consideration, we can at least concede that each contains a sufficient measure of truth seriously to condition any so-called "instruction which makes for character." It is the purpose of this paper to discuss the relation which character building through instruction may bear to the unconscious and more or less instinctive development of character.

In the broadest, and perhaps fittest sense in which it can be used, character, in anything, is adaptation to environment. Let us illustrate: We sometimes speak of some magnificent tree as having character; *i. e.*, to us it expresses power, strength, endurance, beauty and symmetery. But notice that these terms merely express the total impression which the tree makes upon us when estimated in the light of its place in the environment. By virtue of its power, strength, endurance and fullness of growth, it is fitted to resist the rude blasts on the mountain top, to draw nourishment from the most reluctant soil, to reproduce its kind. It not only resists a harsh environment, but makes encroachments upon it.

Very much the same thing could be said of any animal character, as in the case of the lion, to whom we are wont to ascribe royalty and majesty, as well as grace, beauty and power. Shorn of their figurativeness these expressions merely describe traits which fit the animal to cope with, to impress itself upon, its environment. Take the lion away from its natural environment, behold it, *e. g.*, cowering and fawning beneath the lash of its trainer and master, and its character, *i. e.*, grace, power, beauty, majesty, all vanish.

But the term character unquestionably gets its broadest application when referred to mankind and human productions. Yet here the estimate proceeds in the same way. A painting, a statue, an opera or symphony, has character in proportion to the force it exerts upon the human mind and heart. A man is strong or weak in proportion to the power with which he impresses his fellow-men. He is practical if his force meets a certain class of needs in his environment, courageous if he opposes a threatening or dangerous environment, provident if capable of extending his control of environment into the future, religious in his conception of the unity and ultimate meaning of his environment; truthful, faithful and just in his efforts to preserve and further the environing social order. Describe it as we will, character always bears this direct reference to the degree and variety of force the individual exerts upon his environment, *i. e.*, to his fitness to exist in it and to modify it. A character picture, then, is not a crystallization of any set of human traits, as we find them enumerated in the philosophies; it is merely our very practical way of judging of a man's actual and potential fitness to his environment. So our definition of education would run as follows: education is the process of consciously directing the growth of the child toward its greatest fitness to meet, control and modify its environment.

In further defense of the definition of character offered above, we may note that the great problem of fitness is seen to be involved in every form in which, either consciously or unconsciously, nations, societies, or philosophers have cast their aim in training youth. At one time it may be the mere perpetuity of what has become traditional in industrial and social usage, as in China; at another it may be the desire for territorial expansion which has shaped the educational ideal of more than one people, as in England; again, it may be some single feature of fitness, as the religious (Pietists), moral (Herbart), or civic (Rome), traits of character, which receive special emphasis; or traits which adapt peculiarly for self-preservation, as physical prowess and mother wit (Sparta).

In every instance, however, the point of view is seen to involve the problem of fitness of character, as it is understood by the human mind at the time. In every instance a new condition in the environment causes the aim in education to shift and to give emphasis to some new feature of human character. In other words, in the conscious efforts at education, mankind, still unconsciously, has been seeking a greater measure of that which nature ordinarily supplies; namely, fitness of character, or adaptation to environment. So that it would seem to be a fair question as to whether we ought not consciously to define both education and its aim in terms of fitness to environment.

The purpose of such a definition is manifold. It offers a basis for the selection of educational materials and activities which shifts as environment is modified. It makes character, as conceived for educational purposes, a purposeful unity of all the forces, physical, mental or moral, in the individual, a dynamic and not a static product of growth, potential as well as actual fitness. Finally, it is a view-point of character which suggests, at least, a common ground for the operation of both native racial traits and the demands of social environment in the devolopment of character, *i. e.*, for the recognition of both heredity and environment in education.

We are still in the midst of a great psychological movement in the shaping of educational practice. Especially is this true of the effort to adapt the matter and methods of instruction to the *succession* of interests and capacities in childhood. We have to confess that not very much is known in detail of the genesis of mental life, and that the little we do know is chiefly dependent upon the still imperfect science of genetic physiology. But we have caught the spirit of the genetic movement in the large, and this spirit is beginning to assert itself in our practice. On the other hand, the balance of power in practice is still held by the traditional demands of environment. The question is worthy of consideration as to whether either heredity or environment secures its full force in education without an adequate recognition of the other; whether the development of the human individual, in fact, has not been making for the largest possible cooperation of the two; whether finally human character in its best sense is not a skillful balance between the physical, especially neurological, heritage of the race and the complex demands of society, through which man has long escaped the limitations of a merely physical evolution. Somewhere the process of the natural selection of his physical being offered a pronounced physical basis for adaptation by other than physical means. This basis was the higher cortical centers of the brain, emphasized and expanded in man beyond other animals, securing at once the possibility of conscious and rational adjustments and of voluntary readaptations to environments. Right here, upon this almost unlimited physical substratum of memory, imagination, judgment and reasoning was given the possibility of larger social life, and above all of social progress and advancing civilization through the preservation and transmission from generation to generation of the accumulating social experiences of the race.

In man, then, a physical basis is given for a new feature of character, the power of well-nigh limitless social adaptation and adjustment. It is undoubtedly just this plasticity of the human being which has always given environment, in any of its many arbitrary or natural forms, so strong and dominant a hold upon the work of education. Yet there has fortunately always been something equally vital and far more deep-seated in human nature than this surface plasticity. There has gone along with this power of infinite variability, which has given us the strong and independent human individual, a civilization of specialists, and of necessity representative government, all that we express variously by the terms instinct, heredity, "genius of race," and the like, which has supplied the vital motives of human action, and the force of all human character.

We shall get some light upon the relation which the instincts bear in the work of education to training through the impress of environment by some further discussion of their origin and function.

An instinct is an inherited tendency to activity, which has resulted from natural selection. For example, the progenitors of the Anglo-Saxon race in the past have been those possessed of the best powers of self-defense and aggression. They have left their mark upon our race in the form of an instinct, which is variously named, but which is, after all, downright pugnacity. It is true that this instinct arose primarily in response to features of environment which no longer exist in the same form. The early barbaric forms of human environment, which first called it forth, have passed away; but neither the instinct nor the need of it in certain other forms have disappeared. It still constitutes the underlying current of a great deal we admire and seek in character. Wherever the spirit of conflict, of contest and of victory appears, so long as it harmonizes with the social ideal, we still applaud and venerate it. We do so because we feel that here is strength, force, action, such as not only *meets* and *controls*, but *makes* environment. Follow it out in its various forms, and we shall find the instinct of pugnacity as much an element of human life as ever. The same is true of nearly all strong and abiding instincts which are still characteristic of human nature. They arise, by selection, to meet the stress of environment; they are strong because they survived only in the strong; hence they are, as it were, the vital nerve-centers of character.

Take, for another example, the flood of instinctive life which makes its appearance in the early years of childhood, in the form which we call spontaneous play. I think we may agree with Carl Groos that we have to do here with an important instinct, or perhaps organized group of instincts, which can in no wise be accounted for upon the Spencerian doctrine of mere overflow of energy. There are many evidences that the instinct of play is persistent when overflow is out of the question; play is evidently nature's method of training in response to some of the oldest impulses of human nature. But the essential feature here is the fact that play so commonly displays the native bent of character in the child. Here the true foundations of character in the individual make their appearance, if anywhere. The characteristic forms of reaction, the social sense as expressed in ideas of right and wrong and justice, or in leadership and hero-worship, rivalry, perseverance, pugnacity, curiosity, fancy; these and many other traits inherent in human nature find abundant field for action during play. It is here, furthermore, that we find the child not only connected with his race in the very impulses to which he responds, but giving evidence of an organization of hereditary forces peculiar to himself —in other words, possessed of a growing character of his own. Again, in play, then, we have an illustration of how much force, vitality and variety are offered in the instincts as the starting points of character.

With few exceptions, the fact that the instincts are often the product of environmental features which have passed away, in no wise interferes with their usefulness in the adaptation of character to the noblest of present-day surroundings. On the contrary, to recognize and meet the suggestions of instinct in the work of education is rather to furnish the development of powers of adaptability. The instincts condition this power of adaptability in two ways. First, they are generally subject to the law of recapitulation, which is also a law of succession. One instinct in the fullness and vigor of its development conditions others which come later. Thus the instinctive life of the early years of childhood is the foundation upon which rests the higher possibilities of adolescence. The early instinctive efforts at vocalization and imitation condition the later acquisition of speech. The early love of nature, curiosity, and the instincts for collection and ownership unquestionably condition the higher scientific interest. Abundance of sense-activity, including concrete comparisons of the sense phenomena, followed by the exercise of the verbal memory, condition the possibilities of abstract thought and reasoning in secondary education. Always the fundamental, in relative perfection, conditions poise, accuracy, and force in accessory development.

Each antecedent instinct, then, not only makes for character, impels development for its own sake and with its own characteristic force and bent, but it is conditioning in a large measure the course of development of its successors and the impress of environment.

In the second place, the instincts offer a broad field for experience; each instinct is in fact a means of introduction to new lines of experience, which mere contact with the environment, undirected with any innate interest, could never furnish. The different fields to which the senses attend in childhood are not directed alone by mere sense appetite, but rather by definite interests, as play, rivalry, construction, ownership; and these more definite interests are nothing more than instincts.

If this point of view be correct, we have to deal with the following conditions: The field of experiences possible to any child is a very broad one, but the experiences he will actually get, *i. e.*, which will be actually sought and selected by his senses most eagerly and persistently, will be those which respond to his interests either innate or acquired. The innate interests will always be the starting points of observation and action; and these rest upon the instincts. Whatever experiences, then, become vital, forceful, and of permanent effect in the life of any individual, will take their points of departure and be largely directed by the instinctive lines of action. And since the instincts, furthermore, are with each individual the vital points of departure in the development of character, experience will be able truly to contribute to the building of character, about in proportion as it adapts itself to the suggestions of instinct.

This is not equivalent to a claim that instinct is infallible or invariably wholesome. Training must still continue in the direction of adaptation to the highest and fittest standards of a present civilization. But the power of adaptability is directly conditioned by the variety of experiences which can be brought into the child's life during its years of plasticity; it is the instincts which, in their succession, constantly touch the being into new life by opening new fields of experience. The instincts initiate both experience and character.

Furthermore, nature herself provides for a means of harmonizing even the instincts with the demands of environment. I refer to the instinct of imitation. The vestiges of racial experience in the child, his instincts, furnish the main springs of both his emotional life and his action, in spite of the fact that imitation may lead him to the sphere of ideas in which emotion and action operate. Yet imitation seems to exert a modifying influence upon all instincts. As is well known, the force of imitation is apparent very early and lasts till the age of usefulness in life is past. Thus it parallels all the instincts of the important periods of childhood and adolescence, and influences their (the instincts') development. For example, the instinct of vocalization initiates experience in the organs of speech; imitation seizes upon its products and fits them to the demands of social environment. The instincts of play, graphic representation, dramatization and the like are rooted in instinctive muscular and emotional reactions; but they display the constant modification of imitations in the light of environment. A like phenomena may accompany any of these instincts, as of collecting, roaming, hunting, acquiring. As they appear imitation determines very largely what content of experiences and, ultimately, of ideas and thought they shall yield.

But when we speak of instincts or native impulses with reference to human kind it is in a sense by no means so definite or tangible as when we speak of animal instincts. In the latter sense the term ordinarily connotes a very definite, specific reaction of the animal upon certain stimuli, leading to some equally specific result, the ready and fitting adjustment of the animal to a given demand of its environment. Under the stimuli of awakened sexual organs, of certain visual objects of its environment, or of the presence of its mate, etc., for example, the nest-building instinct of the bird sets it about the production of a home well adapted to the kind and number of its offspring, protection from its enemies, and the like. The outcome is relatively definite and fixed. With the exception of a few forms of reaction common and vital in the first years of infancy, human instincts are by no means so definite or fixed in their lines of reaction. Play is certainly instinctive; yet it is one of the most variable and plastic of the phenomena of human life. Vocalization is unquestionably instinctive; yet it lends itself to any oral language form whatever. Human instincts then are broad indefinite tendencies to action without fixed content except in the most general terms. Now these statements are, furthermore, in harmony with the most recent product of natural selection in the human being, great adaptability. In proportion as instincts lose fixednesss and definiteness in their lines of reaction, may the possibility of varied and complex adaptation and readjustment to environment increase. In such event the instincts come to take the place of initial stimuli, the reactions upon which are determined by environment, by education. For the human being, and in education, then, the instincts appear as the most fitting opportunities for modification through and adaptation to environment; they unquestionably furnish the active, the impellent elements of character, while education, tradition, environment, etc., furnish its content. If these two propositions be tenable, the instincts can have no further significance for education than that of strong, deep-seated tendencies to action, the force of whose cooperation education can either fully or meagerly recognize and enjoy. Thus we leave the fullest possible scope to the modifying and adapting action of education, with full consciousness of the demands of environment so long as education does not weaken itself by failing to utilize the combined forces of racial and individual bents.

If the preceding paragraphs contain, in the main, an essential truth, there are two comparatively distinct and yet cooperative lines of effort which the instructor may put forth. First, he may devote his skill to the inculcation of moral ideas; yet if he bend his energies solely to this end he will produce merely a morally well-informed character, one whose reactions may be accurate and poised to the needs of environment, but too apt to be devoid of the breadth of life or of sympathy and aggressive undertaking. Second, he may touch into life and activity what he can in no wise create, the native, *instinctive* nerve-centers of character, that heritage of the race which has predetermined his pupils initial force and strength in life; yet energy spent in this direction alone would be productive of the unruly, the unusable member of society, strong in his own conceit, potentially admirable, but out of tune with man and his institutions. In some way education must secure both lines of effort in cooperation.

It is true that, supported merely by the instinct of imitation, instruction may do much simply through the instrumentality of ideas. Once acquired, and thoroughly consigned to one's habits of thought, moral ideas have a certain weak inclination to dominate the individual's reactions; but just how far they become true moral forces is always a matter of doubt, if life itself is not infused into them. Yet they are very important. There must always be room for the vital work in instruction of liberally imparting to the child moral and social and practical ideas, which shall reveal the best points of contact with human life by teaching of the standards, aims and ideals of his race and of society. But no standard, aim or ideal can have anything more than a formal significance until it gets the cooperative force and motives of instinctive life behind it. The motives of instinctive life, self-preservation, sympathy, and the like, are few, but strong. All acquired motives must take root in them before they can bring about the most effective modifications.

In the light of the immediately preceding thought it would seem to be imperative that the teacher seek to reach in some way the instinctive and emotional centers of the child's life in order that adaptive instruction may become, what it is too often not, *vital.*

We are presupposing, then, in the instructor who "makes for character," a certain "vital touch" which, as a character-building force, rises superior to all his professional technique. Strictly speaking, he cannot "make" character; he can only set its initial forces free through the quickening of the artist touch, lend them ideas, purposes and standards that shall harmonize with civilized and inspired humanity, and guide them in their organization into the personality. But, after all, he stands strictly without the forces he seeks to influence and is subject to their laws. Everything then, in truly educative instruction, will depend upon the personality of the teacher, upon the possession of the "vital touch," or the "artist touch."

Art is meant to reach the deeps of human life. There should be a great deal of it in the personal powers of the teacher, among whose purposes is that of calling the pupil's dormant emotional life into safe and purposeful activity. The personal and social contact of the teacher, his expressed sympathy, not alone with human beings directly, but also with their work and products, the revelation of a strong, earnest and genuine interest both in his pupils and in the tasks upon which he and they work in common,—these are some of the personal forces in the teacher which help the student to assimilate moral and social ideas *as forces*, warm with the best life he feels, rather than as cold propositions.

The teacher's powers of expression have much to do with the kind and quality and degree of the hold which those subjects which deal with moral conceptions may take upon the pupil's life. A single illustration will suffice to enforce this thought. We are wont to regard the entire field of literature as one making for the development, elevation and refinement of human character. Indeed, it can scarcely claim a place in educational work if such be not the case, for amusement or entertainment is all it could claim of usefulness beyond its power to fit for life. Yet in this field we are rapidly coming to the realization that best results are not always had through cold and careful analysis, however essential that may be, but rather through literature orally well expressed. The writer recalls the transformation of a ninth grade class laboring over the dull and painful analysis of "The Ancient Mariner," when a visiting teacher of literature made them listeners for a time, and held them awed and spellbound by the charm and sympathy and conception of the great theme, through the warmth and sympathy and art of her own voice. It is essential first that interest be aroused, that the literary themes and the literary forms touch some chords of sympathy in the emotional life of the student. Hence the ability to read well will always condition the success of the teacher of literature. This same demand for power in the arts of expression holds good for any field.

Powers of description and narration are other means by which the teacher may seek to secure a wholesome cooperation of the emotional substratum of moral life in the child. Yet emphasis must be placed upon the word "wholesome" This educational field of emotional development is probably one to which a good deal of attention will be given by teachers in the near future—in part, perhaps, because it is so imperative in the delicacy of its requirements, so difficult successfully to undertake. The writer recently observed a teacher who had used the art of vivid description in the emotional preparation of her class for a song. It was work in which she was markedly successful; yet, upon this occasion, she proceeded in the same way to get the class ready to sing to visitors, forgetful of the fact that her very presence, manner and face should be able to suggest all which she had formerly developed, forgetful that the attempted repetition of any preparatory emotional effect but too easily becomes pure formality, forgetful finally that an art product, once acquired (in this case the song), is in its rightful function its own stimulus to the emotional. How easy it is for the teacher to let her method or her device rise between herself and her pupils and destroy the very effect which it is intended to secure! Every emotional appeal must be absolutely genuine and spontaneous, devoid of any suggestion of formality and of straining after effects.

Whenever instruction can work in harmony with the successively unfolding emotional tones and impulses of childhood and youth its problem of the "vital touch" will be simplified. Adolescence offers a good illustration of this thought. There is no time when emphasis may be so fittingly placed upon the literature and art of the sentiments, when, indeed, the whole field of art may be brought to bear in the control and refinement of character, especially on the side of sex, as during the adolescent period. We do not know all we could wish to know of the problem of development from within, but the teacher who has some familiarity with the literature of child-study, and who is keenly sensitive to the evidences of native interest and impulse in her individual pupils, will find a way to cooperate with their force.

The work of John Dewey, as presented in his school at Chicago and in his work "The School and Society," is a further illustration of what education may do with this problem of fitting character to environment through the cooperation of native impulses and community life. In this case the very strong social interests and the impulses to investigate, to construct and to express artistically (that is, for social effectiveness), are made the mighty mainsprings of the movement in the direction of an intelligent and sympathetic grasp of modern society.

The Culture and Training of the Intelligence and Will.

By Frederic L. Luqueer, Principal, Brooklyn.

I.

IT was in the midst of summer ease and enjoyment that the letter of the editor of these MONOGRAPHS came, reminding me with inexorable kindness that manuscript on this school subject was shortly due.

But let the pleasure of the country become bone and sinew for work rather than the flesh of inglorious ease. And may we not put something of the summer mood and the beauty of this Maine coast into the educational treatise? They are not unrelated..

As I write there is ceaseless lapping and almost eager swash of waves upon the shore. The waters are pushed on unresistingly by wind and tide. The wind, blowing not as it listeth, has no self-directing way. The fog and clouds that accompany it are equally obedient to the laws of their component material and the laws of the atmosphere in which they move. How impersonal they are, mindful neither of the farmer eyeing them wistfully for rain nor of the sun that scatters them—touched neither by sympathy nor fear. Surely all this stands as background and contrast to human life, to intelligence and will.

Watch the little sail far out. Overhead, the clouds, pushed by the wind, are moving west; yet the boat goes almost east. The man at the tiller wills it, and his intelligence has seen the means of set sail and controlled rudder to accomplish his direction.

The pleasant sail is filling but a moment of the man's life. Is he himself one of the drifting clouds, or has he set tiller and sails for a voyage as long as life and beyond?

II.

Geschrieben steht: Im Anfang war das Wort!
Hier stock' ich schon! Wer hilft mir weiter fort?
Mir hilft der Geist! Auf einmal seh ich Rat
Und schreibe getrost: Im Anfang war die That.

"In the beginning was the Word." It was over the translation of the original of this statement that Faust pondered, and becoming involved in his efforts to comprehend it—for how a Word before a Mind, or a Mind before Facts with which it deals?—gave up philosophy and its questionings for excitement and pleasure. A man of extremes. Yet the problem is still there. And, although wisely, men are seeking accurate knowledge and explanation of things this side of the absolute beginning, the question of that absolute beginning still stands.

There is the other philosophical problem of the freedom of the will. Are human acts merely a few of the happenings that take place in a mechanically ordered universe? Or is there some elemental power in will which when exercised is an expression of original force? And how is this personal original force related to the mind and will of God?

Education of the will must deal with these three phases of the problem: First, it must recognize the influence upon willed acts of the precedents and motives of the action. It must recognize that these have *almost* determining sway. Second, it must *believe* (and here a worthy will-to-believe must be insisted on) that the soul is free and master of its fate; that there is the imperative of duty, which cries, "Thou shalt do what thou knowest to be right." All the lessons of life should lead to a filling up of the content of the idea of right. But this is apart from the fiat of will that strives to realize the idea one has of right. This fiat is the voice of original power. Third, education must deal with the relation of the individual will to the social will, to the institutions of civilized life—family, neighborhood, government, church; and to the will it can best conceive of God by aid of obedient service, of meditation, and again of purified and enlightened service.

Which is awakened first, the intelligence or the will of the child? The will seems prior. It moves and acts in innumerable and aimless ways. It is as the result of the accumulated experience of this activity that the intelligence is born. Memory of former acts and consequences, picturings of desirable ends, and the restless driving of the will toward these ends—this would appear the order of development.

Education must deal with this composite personal character. The intelligence must be illumined, it must have clear notion of right ends; the will must act, it must strive to realize them. And not mechanically. The picture of the imagination and intelligence must be warmed by the emotions, by love of some one who did thus and so. Imitation, emulation must put life-blood and color into both mind and will. The influence of the emotions should not be ignored in any thought upon educational problems. Says Professor Murray: "In order to make any action easy and ultimately habitual, it is extremely important to enlist a strong emotional interest by helping the learner to find pleasure in the object sought as well as in the means by which it is to be reached." Then, too, there is the reciprocal influence of the intelligence and will upon the emotions. These are not to slip from the leash. For, again in the words of Professor Murray: "Though a useful servant, emotion is a tyrannical master; or, to change the figure, though it may be a kindly breeze to waft the will to its haven, it may become an irresistible storm in which all intelligent volition is wrecked."

III.

There is such a thing as will-lassitude. I find this that expresses it in the energetic little paper, the *Philistine:*

"I wish the bottom of the hills
Were moved up to the top;
Then when I wanted to go up
I'd simply have to drop."

Sometimes the intelligence sees an end which the will is unable to accomplish. Hamlet's mind saw clearly what he, as son of a murdered father, had to do according to the code of his time. Yet what a lag-behind did he deem his will to be. This is an old experience of the race. The spirit is willing, it sees what should be done; but the flesh is weak, the will cannot screw itself to the holding point.

On the other hand, there is the over-activity of the will, that acts without intelligent aim. Hence many of humanity's scars. Here are the busy-bodies whose quick fancies picture endless things to do, and whose energy, commendable if but better directed, makes them do and do amazingly. Then there are those whose passions paint in luring colors an end of desire; intelligence and conscience are blindfolded and gagged, and the blind will presses on to its fancied satisfaction. And crime results.

How many hours are frittered away in vague imaginings of what one might do or be. Yet these imaginings and aspirations are not without value. Remember Rabbi Ben Ezra.

"Not on the vulgar mass
Called 'work' must sentence pass.

* * * * *

All I could never be,
All, men ignored in me,
That I was worth to God, whose wheel the pitcher shaped."

A man's life would be meagre indeed if it were limited to the attainable. In youth there is needed that sensitiveness of imagination that is open to impression from events and lives beyond the boy. Reverence and appreciation are real attitudes of soul that education should endeavor to nurture. What does the poet or painter appeal to, if it is not to this faculty of appreciation and inner receptivity that most of us have while the productive, creative power is lacking? There is a place for the child's revery—"the large-eyed wonder and ambitious heat of the aspiring boy." Therein is something of Plato's recollection of ideal beauty and of Wordsworth's intimations of immortality. We should not break in upon it ruthlessly.

"I remember the gleams and glooms that dart
  Across the school-boy's brain;
The song and the silence in the heart,
That in part are prophecies, and in part
  Are longings wild and vain."

IV.

Yet revery should be but the rosy clouds of sunrise over the solid hills of doing. Just as one should not too much surrender himself to the passive enjoyment of emotions—it may be of heroism, of self-sacrifice, of achievement—without the subsequent striving to act, to dare, to do for others, to succeed; so should he no more be content with contemplative or merely appreciative intelligence. He should not live as a poor hermit in a gallery of wonderful pictures, but should, as it were, take palette and brush and himself be the artist of achievement.

Out of revery should come an impulse to better our condition, our character—to become actually more what we aspire to be. If to be a lawyer, there should be the large-volumned study of cases; if a painter, the day-by-day work with the brush; if an author, the daily self-immolation of hours of study and of composition. Happily each hour of work clarifies the vision for richer revery, aspiration.

It is not merely the seeing the thing-to-be-done that constitutes the will to do it. There is will muscle as well as arm muscle. The will may be flabby while mental perception is peculiarly clear. We all experience this. Our education must recognize this and endeavor to develop will fibre. This is not completely done by the imposition of rules or tasks, enforced by a teacher's authority. While this must be present, there should at the same time be clear purpose in the teacher's mind to have the boy or girl obey the rule and work at the task from inner incentive. Aim to develop habitual self-control in little things. Take, for example, the effort to walk erect, to hold oneself well, to pay attention. This demands will and strengthens will. Pestalozzi was a firm believer in this. At Stauz he tells us: "One young girl, for instance, who had been little better than a savage, by keeping her head and body upright, and not looking about, made more progress in her moral education than any one would have believed possible." Encourage small acts of self-denial, of polite attention, of emulation both at games and in the schoolroom, in the street and at home; remembering, as to our method of encouragement, that, as Joubert puts it, "children have more need of models than of critics."

And for us teachers, examples as we must be for our children, Emerson has said what I would say in this connection: "Action is with the scholar [should not the word teacher be synonymous ?] subordinate, but it is essential. Without it he is not yet man. Without it thought can never ripen into truth. Whilst the world hangs before the eye as a cloud of beauty, we cannot even see its beauty. Inaction is cowardice, but there can be no scholar without the heroic mind. The preamble of thought, the transition through which it passes from the unconscious to the conscious, is action. Only so much do I know as I have lived. Instantly we know whose words are loaded with life, and whose not. The mind now thinks, now acts; and each fit reproduces the other. When the artist has exhausted his materials, when the fancy no longer paints, when thoughts are no longer apprehended, and books are a weariness,—he has always the resource *to live*. Character is higher than intellect. Thinking is the function. Living is the functionary. The stream retreats to its source. A great soul will be strong to live, as well as strong to think. Does he lack organ or medium to impart his truths ? He can still fall back on the elemental force of living them. This is a total act. Thinking is a partial act. . . . . Time shall teach him that the scholar loses no hour which the man lives."

V.

It may indeed be urged that our present educational system overstimulates the intelligence to the neglect of the practical will. It is as if one should fit out a vessel with beautiful masts, spars and lines, but forget sails or steam or rudder.

In an *Eagle** editorial of recent date concerning the marked increase in high school education, there is this forceful statement: "Some of the consequences of a widespread craze for a higher education for everybody are by no means promising. . . . If we are to become a nation of educated gentlemen, who is to do the hard and unpleasant work which our own boys acquire education as a means of escaping? . . . The time will come when we must raise, within our borders, the great proportion of our hand laborers as well as our brain workers. The chief problem of education is to reconcile the knowledge of science, literature and history, which the high schools give, with a respect for manual work and a willingness to do it."

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* The *Brooklyn Eagle*.

How often the will, aspiring toward a seeming desirable end, lacks the critical intelligence to weigh the real advisability of that end or to hit upon the right means of attainment. Here is a slave mother with a bright and lovable son. She has seen the power and knowledge of the whites, and she longs to have her boy "educated"—to have him read and write and know books. Her longing becomes the son's ambition. Is a Booker Washington always the result? No, the supreme effort of that Booker Washington is to direct that ambition and love of higher place, generally wrongly directed, into practical knowledge and effort. The tendency of the ambition is to seek the soft-handed and head-filled level; to forget that food and shelter must be won in the first place by sweat of toil, by handicraft, carpentry, bricklaying, lumbering, cotton-growing or stock raising. The necessity for this, so evident in the case of the negro, so clear to the strong mind of Booker Washington, is in danger of being forgotten by our own public education. The wheat fields of Canada call for farm laborers, our western States need them; yet our school geography lessons talk of the acres of wheat and orchard lands as so many facts to be committed to memory, not as actual conditions calling for the possible future labor of the pupil.

The matter is a difficult one, for not all the children are to be farmers or hand workers; but, just as truly, neither are they all to be head workers, writers of books, or teachers, or lawyers or statesmen. In some way the elements of both spheres of life must be united, so that it shall not seem that the honor and the glory sought by a young man's ambition are to be found in the literary or learned careers alone, but are equally to be won at the plough or with the plane.

Perhaps our industrial conditions are tending to this better possibility. Working hours are becoming shorter, hours of leisure longer. Let it be the aim of education to make labor seem honorable. Then more and more the better minds will seek a life career therein; and if, at the same time, their education has taught them noble uses of leisure, then more and more will be men of richer character and attainment developed among those who labor.

Manual training should be brought into every scheme of education. The world is conquered not by thought alone but by handicraft as well. Even if one is not to be an artisan, he should have that appreciation of the worker's life that comes by the learning and practising of some hand knowledge. The study of literature has not the sole purpose of rearing up a generation of writers. It aims to give appreciation not alone of the topic treated or of the character developed, but also of the author's mind, of his soul capacity. So the boy who learns drawing or carpentry gets something more than a bread and butter winning power in a possible future handicraft. He wins a new view of the world's work, a new sense of creative, or at least of constructive, power.

The intellect is developed in the study of a handicraft. To make a box or plan a house demands accurate thinking through a long range of increasing difficulty. There is, first, the purpose to be served. The box or house must be pictured by the mind, and repictured till they seem to harmonize with the purpose—the box's shape, size, its hinges and fastenings, its coloring and decoration; the house's form, artistic yet serviceable, its materials, its position, its rooms and decorations. This calls for a high order of intellectual equipment. Then the will is exercised in carrying out the plan. The boy who wishes to make a box, and patiently sharpens his tools, and plans the wood, and fits the joints, and varnishes and finishes the whole has had an invaluable lesson in training and will. The man who actually builds the house—think of the will-strength he has gained.

The rôle played by creative imitation cannot be overlooked, This is a problem both of the intelligence and the will. Love and respect should be the emotional incentives to imitation. Here we have differences. One boy respects and would imitate a hunter; another a man of business; another a missionary; another a soldier. Fortunate for the world that this is so. A teacher should not seek to be imitable professionally (save by the few who are to be teachers), but morally. Self-poise, controlled voice, courtesy, wide-interestedness, sympathy—these should draw out the child's esteem, and form a sweet something toward which, vaguely perhaps, the child may aspire. Aspire he must and does. Let us believe this and then sympathetically draw out his effort for realization; then help him see the shortcoming, and then encourage a new effort toward the more clearly defined ideal.

This process should go on in all teaching. The steps of it are very clear in a writing or drawing lesson. The model is sensibly before the pupil. Conscience and will are developed in the effort to produce something similar. In the case of reading, the model must be renewedly presented by the teacher. So in elocution; and what a test of will and intelligence, transcending imitation, is the proper rendition of a poem by Longfellow or a scene by Shakespeare!

Even reading to one's self is a matter of will education. Thoreau says: "To read well, that is to read true books in a true spirit, is a noble exercise, and one that will task the reader more than any exercise which the customs of the day esteem."

Hand action seems more primarily related to the outgoing activity of the will than does study or reading. And this hand work has a healthful reflex influence upon the intellectual will-activity. Thoreau writes of his first summer at Walden Pond: "I did not read books the first summer, I hoed beans." Take Seton Thompson, naturalist, artist and author. Incidentally, it is said, he is a good carpenter. He loves to steal away from his easel or desk, get out a box of tools and put up a few shelves or repair some damaged door or window. Then there was William Morris, painter, poet and novelist, who found recreation and soul-suggestion in handiwork, in designing wall-papers and tiles, and in printing books, like our own Roycrofters. "To carve in wood, weave bright strands of silk into cloth, hammer iron into shape, to paint pictures and to draw forms, was to him a delight. And there was only one thing that gave William Morris more joy than to do things with his hands, and that was to show others how to do things with their hands." Of King Alfred, the millennial anniversary of whose death has just been celebrated, it is written: "He not only longed for the love of his subjects, but for the remembrance of generations to come. . . . To the scholars he gathered round him he seemed the very type of a scholar, snatching every hour he could find to read or listen to books read to him. . . . He passed from court and study to plan buildings and instruct craftsmen in gold-work, to teach even falconers and dog-keepers their business."

I do not know that Emerson repaired the chimney of his house very successfully, but the instinct prompting him to do it was good. He believed: "A man should have a farm or a mechanical craft for his culture. We must have a basis for our higher accomplishments, our delicate entertainments of poetry and philosophy, in the work of our hands. We must have an antagonism in the tough world for all the variety of our spiritual faculties, or they will not be born. Manual labor is the study of the external world. . . . When I go into my garden with a spade and dig a bed, I feel such an exhilaration and health that I discover I have been defrauding myself in letting others do for me what I should have done with my own hands. . . . Not only health but education is in the work. Labor is God's education."

In the school, in the absence of assigned manual training work, teachers should encourage this hand industry. Our city schools have not school gardens such as Froebel would like, but our teachers can instill a love of flowers and the ambition to make and to see things grow. Many of the dingy London houses are beautified by window flower boxes, and our own city, bright and free from smoke and fog as it is, might be the more beautiful were the boxes more common here.

The boys may be induced to make things and to bring them to the school. The vacation schools have done much in this regard. The teachers during the winter should not let this summer-awakened interest die. It will, if cherished, reacct happily upon the interest in history and composition and conduct.

VI.

The government of the school should foster a steady growth in will power controlled by intelligent perception of ends. Says President Eliot: "To reduce to lowest terms the influence of authority, and to increase the influence of the individual reason in reaching mental conclusions and determining conduct, should always be a prime object in the schools of a democratic society."

Good order is demanded in the classroom, so that instruction be unhindered and the rights of no child to such instruction invaded. The orderly marching at recess times, the quiet passing in and out of the building, the erect posture and bearing, all are phases of a good will socially controlled. School rules should tend to this. What Goethe said of a good government is true of a good school. There is no fairer sight in the world than a kingdom in which every man is proud to obey, feeling that he obeys his own will as well as that of the prince, because, there, only right is law.

"Es ist kein schönerer Anblick in der Welt,
Als einen Fürsten sehen, der klug regiert;
Das Reich zu sehn, wo jeder stolz gehorcht,
Wo jeder sich nur selbst zu dienen glaubt,
Weil ihm das Rechte nur befohlen wird."

The government of the school would lead to freedom. Not that it would take authority away, but that it would make that authority seem rational and honorable—at one with the highest. Then, if the child recognizes this—and how ready most children are to recognize it—he, by that recognition, is lifted up to something of the same level and approaches the day when that authority and law seem not as something imposed from without, but as something that is a part of his own nature and which he freely follows.

All this, of course, is a matter of slow growth, and hardly, save in tendency, attainable in school years. Indeed, can we go faster than this Confucian analect? "The master said:

'At fifteen, I had my mind bent on learning.

'At thirty, I stood firm.

'At forty, I had no doubts.

'At fifty, I knew the degrees of heaven.

'At sixty, my ear was an obedient organ for the reception of truth.

'At seventy, I could follow what my heart desired, without transgressing what was right.'"

VII.

The problem of educational philosophers is to formulate the educational ideal. Perhaps this cannot be stated in one sentence. We may be sure that it will have more than individual significance. A man is not complete in himself. Crusoe on a desert island cannot long remain Crusoe. He has affections, duties that go beyond self to family, neighborhood, state, God. To be a good citizen of a good state is a grand, if, possibly, incomplete, statement of the ideal. To perceive what a good state is and to comprehend it demands large intellectual culture. The state is a growth. It has a history. The forms of government are diverse. Which is the best? How can each best fulfill its purpose? How can each be improved?

Nor is the state an end in itself, either. That cannot be a good state whose citizens are unworthy. The good state gives opportunity for, or at least does not hinder, the best development of the individual citizen. Think of the nature of the problems presented by this fact. And if human society is a thing to be bettered by conscious thought and effort on the part of its members, how great the range for the best work of intellect and will! The intellect of the educated citizen must strive with the problems, and the will must no less be eager practically to achieve the ends pointed out by the enlightened and cultured mind.

Self-Control and Self-Employment as Ends to be Sought in Education.

By L. Seeley, Professor of Pedagogy, State Normal School, Trenton, N. J.

THE process of education is a process of emancipation. The normal child is born into the world with wonderful possibilities, but fettered by ignorance. It is the office of education to remove this ignorance, to set him free. The new-born babe is literally "a little stranger" to the world. He possesses nothing but capacity, and yet what marvelous possibilities are before him. He has no knowledge, no power, but in a few years a world of knowledge may be mastered by him, the forces of the whole realm of nature may be within grasp and at his command. He has to learn how to see, to hear, to taste, to perceive, to imagine, to think. What a measureless territory is to be covered between the little child just opening its eyes upon the world and a Bacon, a Newton, an Aristotle, a Gladstone. And yet, to cover that territory is the work of education. The child is in the bondage of ignorance, and every act of curiosity, every exercise of hand, or foot, or mind, every question asked, is a struggle towards the light, towards intellectual freedom. For intelligence is freedom, and he who is in the bonds of ignorance is a slave indeed.

The office of the parent, the natural teacher of the child, and the instructor is to help the child towards this emancipation. But neither the parent nor the teacher can always be with the child, hence he must be made self-directive, must be taught how to continue his education after the above-named agencies have completed their work. Success will attend the continuance of that work just in so far as two qualities or powers have been developed, namely, the power of self-control and the power of self-employment. I propose to discuss these powers as ends to be sought in education.

SELF-CONTROL.

"The noblest lesson taught by life
To every great heroic soul,
Who seeks to conquer in the strife,
Is self-control."

The Spartan boy suppressed every evidence of pain, and even faced death, without flinching in order to win the approbation of his seniors; the Indian stoically endures barbaric torture so as to rob his hated enemy of his greatest triumph; the Christian martyr is oblivious to the agony of the stake in his ecstatic contemplation of heavenly visions and in anticipation of future bliss; the mother conceals her anguish over her sick child with an outward semblance of cheerfulness. These are examples of primitive self-control, the control which nature demands.

We are constantly meeting in every-day life illustrations of this power or its lack. He who is able to command himself, even under great provocation, and not give way to violent temper, excites our admiration. The man that intemperately yields to his desires, whether it be in eating or drinking, or whether it be in the gratification of animal passion, and is unable to place a proper curb on them, awakens our pity if not our contempt. It will thus be seen that the ability to exercise self-control may be accepted as the criterion in deciding character. Possession of this power means a temperate, well-balanced, reliable man; lack of it shows itself in intemperance, eccentricity and instability.

Now, if education has for its main purpose character-building, the training to self-control should be an important function of the school work. It should be begun in early childhood, even before the child enters school. The discipline, whether in the home or the school, should not be merely that of the stronger intellect over the weaker—it will be that of course—but I say not *merely* that; it should be such as will lead the child to weigh and consider and finally to act from inner impulses rather than from external ones. One or two illustrations will suffice to make this point clear. When the parent gives his child a weekly allowance of money and holds him strictly to it, he is training that child to self-control. For if he spends all his money on Monday for something that strikes his fancy and has to go without for the rest of the week, he will be more careful what he does with his next week's allowance, thereby having self-control. Again, in the school the teacher trains his pupils to do right, not because it is according to the rule, but because it is right. Whenever the teacher places his pupils on their honor he is training them to self-control.

But how shall self-control be taught to children? Let me answer:

1. Make the child feel the loss of the love of those dear to him when he gives way to unbridled anger, to selfishness, or to other intemperate action.
2. Appeal to his sense of shame and make him uncomfortable because of his wrongdoing.
3. When he is old enough appeal to the fear of God, and the wrong in His sight as a motive for abstaining from evil and as a reason for controlling himself.

The faithful and patient use of these and similar measures will have the effect of giving children that perfect command over themselves which makes him urbane, self-possessed, thoughtful of others, and of good character. It also gives them a reserve force upon which they can call in an emergency.

The person who has learned self-control is able to look down from a bird's eye view upon the individual desires, inclinations, and feelings, to weigh them by rational principles, and to allow or suppress their outward expression at will. To teach pupils this power is a most important end of education. "If I become enamored of the body and its ways, and of the subtleties of a fleeting bodily intelligence, I have forgotten to control these things; and having forgotten that I have a free will given me from heaven to rule what is mine, I am no longer a man but a beast. But while I, who am an immortal soul, command the perishable engine in which I dwell, I am in truth a man. For the soul is of God and forever, whereas the body is a thing of to-day that vanishes into dust to-morrow; but the two together are the living man. And thus it is that God is made man in us every day."

SELF-EMPLOYMENT.

The early common school of our country, with its untrained teacher, its large number of pupils, its scanty furnishings, its few books, was nevertheless not destitute of splendid products. It gave to the world Washington, Jackson, Lincoln, Franklin, Greeley, Clay, Henry Wilson, Edison, and hosts of others, who have wielded mighty power in the political, intellectual and material progress of our land. The teacher had neither the time nor the ability to do much for these boys, hence they were obliged to employ themselves, to seek the truth through obscure paths and rough ways with but little help from outside. This experience doubtless made rugged, self-reliant, ambitious men.

Now it is quite common to point to these illustrious examples and draw the conclusion, that as they came from the back woods, ungraded, poorly equipped school, therefore such a school is the best if we are to produce great men. Such a conclusion, however, is quite unwarranted, for the following reasons:

1. If these men became illustrious under such limitations, is it not fair to suppose that they would have been even more illustrious had they been favored with better school facilities? They became great in spite of rather than because of such limitations, for surely no one would say that the lack of facilities in the old-time school was a blessing.

2. While no one would minimize the attainments of these wonderful men, it must not be forgotten that it is easier to rise above a low level of intellectual standards than above a high one, and that the standard is much higher now than it was half a century ago. A man may have much higher attainments now and still not be above the average of his contemporaries, and therefore not stand out with any degree of prominence. In a word, to stand out as a landmark

requires far greater attainments than would have been necessary a hundred years ago. A pine tree standing in the midst of an open field is a conspicuous figure; the same tree in the midst of other trees of the same kind in the forest would escape notice.

3. We must wait a generation or two before we can properly estimate the men of to-day. Not one of the above-named men was adequately appreciated while living. They were caricatured, ridiculed, maligned, hated—some of them even unto death. But posterity yields them the homage due them. It will be the same with great men now living, for we certainly have them.

4. These men possessed the capacity and were not to be denied whatever the obstacles. Erasmus starved himself in order to buy Greek books; Lincoln had scarcely more than three books, the Bible, Æsop's Fables, and Pilgrim's Progress, but he committed to memory large parts of each of these; Faraday, the newsboy and bootblack, read and studied in his stable loft, until he secured the interest of Sir Humphrey Davy, who opened the way for him to become the greatest scientist of his age; Franklin, when notified by his landlady that she could not longer furnish his gruel at the same price, replied, "Make it thinner," so poor was he and so eager for an education. These boys all possessed the capacity and they set themselves at work with the means at their command to accomplish chosen ends. With this marvelous capacity and with the superior facilities of modern times, no man can tell what they might have attained.

But in all of these cases we see that the power of self-direction and self-employment brought victory in spite of obstacles. It may well be asked whether in our modern plan of education we have not gone to the other extreme and are carrying the child too much in our arms instead of teaching him to walk alone. We would not go back to the old-fashioned school, but we would learn the lesson of self-employment which it certainly taught its pupils, and find out how to adjust that idea to our improved schools and our extended means of education.

A large part of success in life depends upon the ability to employ one's self. Observe the boss of a gang of workmen, the head of a department in a store, the trusted foreman in a great manufactory, and you will find that every one of these men has risen to his responsibility and greater emolument because he knew how to set himself at work. Employers are watching for men capable of leadership, and when one of their employees shows the ability to assume new responsibility they are only too glad to give it to him. It is easy enough to find men to do the drudgery, the ordinary duties of an establishment; it is always harder to secure leaders. The young man who watches the clock or listens for the whistle announcing the hour of release, the man who is more alert in leaving business than in beginning it, is not the one who will get ahead in life. To such an employee the contract is merely so much money for so many hours in the shop, without the slightest interest in the business. I once called at a large wholesale house in Chicago to meet a young man who worked there. It was Saturday and the store closed at twelve o'clock. I asked a member of the firm for the young man, and he replied that as it was near the hour of closing, my friend would soon be down. Turning to the timekeeper, he said, "Who will be the first man out?" "Irwin," was the reply. Just then the whistle blew and sure enough the first man ready was my friend Irwin, who appeared in an incredibly short time considering that he worked on the third floor and had to remove his working clothes. A few months later when business became slack, the first man to be discharged was Irwin!

My neighbor owns large grounds and wishes to employ a man to take care of them. Now, there are two kinds of men that offer their services—one kind consists of those who must be told each morning what to do; the other kind consists of those who simply take charge of the premises and need no telling. If the lawn needs to be mown, the gravel walk to be raked, the garden planted, the carriage washed, they do not need to be told; they see what is to be done and can set themselves to do it. It is again the power of self-employment. Now there is no comparison between these two classes of men as to their usefulness and as to the value of their services. The latter kind of men carry responsibilities, thus relieving the owner of care and making his beautiful grounds an unalloyed pleasure to him. Is it not true that a large majority of those seeking employment belong to the first class rather than to the second? And has not the school something to answer for if such is the case?

Nor is this state of things confined to the male sex and out-of-door work. Every housewife knows the value of help that can be depended upon to set themselves at work as compared with those who must be told everything that is to be done. It is well known, also, how discouragingly scarce the former are. Once more I think the school has something to do. We must teach our pupils habits of industry; we must teach them that honest labor is not demeaning; we must instill into them the idea that the interests of employer and employee are common, that when they engage their service, it pays to give it with fullest zeal and singleness of purpose; we must impress upon them that the surest road to ultimate success is not found in giving the least possible service which will pass muster, but in giving their best without regard to the remuneration. These are the lessons that our American boys and girls should learn, and the school must teach them.

Not long ago a merchant said to me: " It is pitiable what kind of service we get from our clerks. Their idea is to do the least possible work for their pay, and they wonder why they are not advanced. Why, if they will earn twenty dollars a week, I had rather pay them that than to pay them ten. The surest way for them to get the advance is to be worthy of it." If instead of doing the least they can, of waiting to be told what to do, they would have their eyes open for work to do, would employ themselves, they would be on the sure road to advancement.

Now this is a very practical treatment of the subject. I mean to be practical. One has only to observe life, public as well as private, to discover the need of such lessons. The trouble with our people is not lack of ambition, lack of activity, or lack of enterprise, but lack of the power of self-employment. Rosenkranz illustrates this idea when he speaks of apprenticeship, journeymanship, and mastership as three stages of development. The apprentice is the mere learner, the journeyman has learned his trade but must work under a leader, while the master has learned not only how to direct himself, but to direct others. Some one has put the thought very forcibly as follows:

"Who shall pupil be? Everyone.
Who shall craftsman be?
Who good work has done.
Who shall master be?
He who thought has won."

MORAL ASPECT.

There is a moral side to this question that is worth considering. Our working people are asking for and securing shorter hours of service. This makes the need of the lesson I am trying to teach all the greater, for but little evil is possible during the eight or ten hours that a man is employed. It is what he does while unemployed, where he spends his leisure time, that largely determines his moral attitude. Does he read or study, is he interested in religious or philanthropic work, or has he some self-employment when his work is done? Or does time hang heavily upon his hands that he must needs visit the saloon, the gambling den, or some other place of excitement? It is a very unhappy condition when a young man is not equipped with the means of employing himself during his leisure. Provide men with this power and more will be done to close the pawnshop than by any other means, for they will be able to satisfy their own activities without seeking these places.

Sensory and Motor Training.

By Charles H. Judd, University of Cincinnati, Department of Psychology and Pedagogy.

EVERY teacher knows, in a general way at least, what is meant by the phrases "sensory training" and "motor training." The strengthening of the powers of observation and discrimination, the development of the ability to apprehend the objects of one's environment rapidly and accurately, these are the aims of sensory training. Motor training, on the other hand, refers to the cultivation of grace and ease of movement, to growth in manual dexterity and skill of manipulation.

Furthermore, it may be said that the educational world is rapidly reaching a stage at which it is prepared to give adequate recognition to both sensory and motor needs. This is shown by the introduction of a large amount of observation work into the school course and by the equipment of schools for various forms of manual training. Indeed, we are justified in saying that the most striking tendency of present day education is the abandonment of the traditional ideals of education and the abandonment at the same time of much of the traditional material of instruction in order that more sensory and motor training may find place in school work. In view of this marked tendency it is important that teachers examine critically into the true character and value of these forms of education in order that they may intelligently introduce them in just proportion and in appropriate manner into the school.

We may begin such a critical examination by a negative statement. Sensory training in its true character is not mere cultivation of the senses. Some teachers make the mistake of believing that, if the child is to have the fullest possible sensory development, he should become like the tea taster, for example, with his sense of taste cultivated to its highest possible perfection. Educators have sometimes been heard to deplore the backwardness of the human species in matters olfactory. The senses, we are frequently reminded, might be very much more acute than they are, if we would only devote more time to their refinement. All such statements as these just cited lay the emphasis at the wrong point. It is not so much the delicacy with which the sense responds to external forces as it is the intelligence back of the sensation which determines the value of one's sensory experiences. The most striking confirmation of this is to be found in a comparison of human intelligence with that of the animals. The animals differ from us not so much in the refinement of their senses as in their ability to interpret and use their sensory impressions.

If we turn to the positive truth which lies back of the negative statement that true sensory training is not mere refinement of the senses, we may assert it as one of the largest principles of education that it is the business of the school to fill out and complete the child's experiences of the world about him, and it is furthermore the duty of the school to see to it that every experience which is presented to the child is mastered in its significance and in its proper interpretations.

Let us take some concrete illustrations of what is meant by these statements. Children very seldom observe the trees in their immediate environment—perhaps the statement could be made with equal truth of teachers. What is the defect in observation in such cases? Is there a lack of sensory experience? Not at all. There is a lack of what we call attention and comparison and discrimination. All of these processes of intelligent observation are processes which depend on the presence of sensory materials, but they are not processes of mere sensory experience. These processes of intelligent observation cannot be properly cultivated without presenting to the observer real material for observation. We see accordingly, the significance of the present day movements in the educational world towards the collection in the school-room of a great deal of sensory material. Mere abstract description is fortunately giving place to various forms of concrete education. This is the first step in sensory training. But it is only the first step. After the materials have been brought together and offered to the observer in the form of sensory experience, he must attend, compare and discriminate.

There are many teachers who stop far short of the later stages of training. Their pupils get the same sort of education that the proverbial tourist gets from his travel. The senses are excited by great varieties of new stimulations, new forms are seen for a time and enjoyed in a sort of passive way, and then all is over, leaving behind nothing but a bad habit of reveling in much material and thinking little of its value or significance. Some of our nature study, I repeat, has come to be mere sensory dissipation. The only motive in the mind of the teacher seems to be to get more material, and still more. School-rooms are filled with miscellaneous collections of insects and bird's nests and what-not. One Superintendent reports that the school yards in one district are literally choked with rock fragments of all sorts which constitute the collections of "minerals" made by misguided pupils. All this is sensory training gone mad. It is sensory training with no higher motive than mere accumulation of material. It is intellectual miserliness —not wealth.

True sensory training, on the other hand, emphasizes not the bulk of material, but the ability to comprehend that material which is at hand. If teachers would realize this they would have less difficulty in gathering material. Any object may be made a subject of the best kind of sensory training. I once heard a teacher give a class a lesson on the orange. There was as much true observation and as much intelligent natural science in that lesson as in any chapter in any of the best books on biology. The appearance and structure of the outer covering, its adaptation to its function, the inner consistency, the placing of the seeds, and so on, were all discussed by teacher and class and compared with the peach and apple, which had been studied before. The value of these studies was that the teacher understood clearly the relations of all the observable facts, knew how to select the more important characteristics from the point of view of natural science, and then succeeded in getting the children to use their sensory experiences as the starting point for comparison and discrimination, and above all as the starting point for the acquirement of a vast body of related facts and inferences which made the sensory facts only significant.

Some one will say that this discussion has gone beyond its province, which was sensory training. It will be objected that we are discussing education in general under this head. Let us answer this objection by saying that in so far as education deals with direct knowledge of things it is nothing more nor less than sensory training in the true sense of that phrase. One might admit that historical study or mathematical science, or some of the other indirect and abstract forms of education are not of a sensory type. But even here we must be allowed to insist that all introduction into these abstract subjects requires a preliminary training in the intelligent use of words, which in turn depend on a developed power of interpretation that can come only from intelligent observation.

If, then, observation is of such fundamental importance, and if its method is so comprehensive in character, what shall we say of the demands made upon the teacher in conducting such work? The clear requirement is that teachers themselves become intelligent observers. It is quite impossible to get facts out of a book and say them off glibly in the presence of the object and thus discharge one's duty as a teacher of observation and interpretation. One must himself see the significant attribute of the object, one must understand its meaning and relations and then lead others to see it—not merely compel others to repeat verbal formulas embodying some abstract statement. All this is not easy. It is not possible unless teachers will train themselves. Too much of our nature work in the schools to-day is suffering from scrappiness.

It is incoherent and deals with mere trivialties. It is not observation training, it is sensory dissipation.

What has been said of sensory training leads us with directness to the treatment of the second phase of our subject, namely, motor training. There is no surer way of sharpening observation and making comparisons exact and direct than calling upon one to do something on the basis of his observation. Fra Lippo says of himself:

> "But mind you, when a boy starves in the streets
> Eight years together, as my fortune was,
> Watching folk's faces to know who will fling
> The bit of half-stripped grape-bunch he desires,
> And who will curse or kick him for his pains,—
>
> * * * * * *
>
> Why, soul and sense of him grow sharp alike,
> He learns the look of things."

It may not be in many cases the sharp desire to get something to satisfy hunger, but it is always some form of action or inaction which controls the observation. The listless, inattentive man is the man who does not intend to react vigorously to his environment. The alert, intelligent observer shows his alertness, not by bright eye and listening ear merely, but also by a tension of his muscles which indicates ability and desire to act.

We need a very much broader view of action than we ordinarily have in order to comprehend the true value of motor training. There is much bodily action which we overlook because it is not bodily movement. On other occasions I have called the attention of readers of the MONOGRAPHS to the facts which appear here again as facts of importance for our discussion. Holding up one's head is a form of continuous bodily action. It is not movement, but if one begins to fall asleep he realizes that it is action. Not only holding up our heads but the maintenance of an erect bodily position, the expression of the face, the adjustment of the eye and ear to the stimulation they receive—all these are forms of action. If now to these forms of constant action one adds the easily observable movements of hands and face and body, one sees that action is always taking place where there is consciousness.

We may go one step further; the action of a given moment and the consciousness of that moment are very closely interrelated. Our notion of mental life has been too much a notion of passive receptivity. We have thought of consciousness as being exclusively sensory. We have glorified the laws of sensory association into laws of the first importance, saying that two things which present themselves together in experience will tend to follow the law of their presentation. As a matter of fact, there is a much higher law than the law of association; it is the law of *practical selection*. We associate together those things which we can react together. Many things we neglect entirely just because we do not need to fit our actions to them at all. Other things are emphasized far beyond their sensory value because of their significance as cues to action. In short, psychology is rapidly becoming a psychology of action rather than one of mere receptivity or sensation.

Those who are interested in the fuller statement and justification of what has just been said should turn to the works of Professor James, who is the great exponent of the importance of action for mental life. In his Talks to Teachers he describes education as a process of training in behavior. He speaks of that very limited form of action which we have in oral recitation in the following unequivocal terms:

"Verbal reactions, useful as they are, are insufficient. The pupil's word may be right, but the conceptions corresponding to them are often direfully wrong. In a modern school, therefore, they form only a small part of what the pupil is required to do. He must keep notebooks, make drawings, plans, and maps, take measurements, enter the laboratory and perform experiments, consult authorities and write essays. He must do in his fashion that which is often laughed at by outsiders when it appears in prospectuses under the title of 'original' work, but what is really the only possible training for the doing of original work thereafter."

The educational movements which Professor James sanctions above are fortunately so general that there is little need of doing more at this time than to recall the ample theoretical as well as empirical justification for such forms of training. Wherever motor training of a real and productive type has been introduced into the school, sensory training has been made easier and more productive. The significance of manual training and drawing, of laboratory work and all forms of experiment is being more and more fully apprehended.

Again, in motor as well as sensory training there is a danger from unsystematic work in the schools. Not "movement for movement's sake" should be the motto in motor training. Not wholly irrelevant movements, but rather appropriate actions, and if possible productive actions should be cultivated. Some pedagogical writers have used the analogy of training imbeciles, and have said that as the best forms of training of imbeciles always advocate first of all the production of action, so in the school we should aim at the production of some kind of action. The difference is that in the normal child there is always a superabundance of movement always at hand. The duty of the school to him is, not to arouse any movement, but rather to arouse and insist upon cultivating the appropriate movement.

If now one asks what are the methods of cultivating appropriate movements, he has asked a question that present-day pedagogy is very illy prepared to answer. As a matter of fact, we have devoted but little attention to the study of appropriate forms of motor training. Take, for example, that ancient form of motor training in the schools, namely, writing. There is no better illustration of a pedagogical problem which has been entirely neglected, and even unrecognized, generation after generation. Teacher and pupil alike join in a blind struggle to gain the motor training necessary for the attainment of the ability to write. The child does not know how to train himself. Teachers have spent their energy discussing the product of his effort and the forms which should be presented to him as the sensory basis of his efforts, but there is hardly a word in all pedagogical literature on the movements involved in the act of writing or in the stages of motor training through which the child must pass in learning properly and economically the art of writing. We need to recognize that the hours of practice spent in learning to write are hours during which the educator should help in the training of the motor functions. We need to realize that there is here an educational problem of just as much importance as the educational problem involved in training the senses. In short, we must learn that both problems of sensory and motor education are but phases of the single problem of training an individual who is at once receptive and expressive, who will be receptive in the degree in which he is expressive, and in that degree only.

The discussion of these two problems in closest relation should serve one end if it serves no other. It should turn the attention of practical teachers to the subject of the unanswered pedagogical problems that present themselves in the sphere of motor training. The chief difficulty with our sensory training is that it is fragmentary and unsystematic, but when we come to take up motor training the deficiency in our pedagogy is of a more serious type. The work is often unsystematic to be sure, but it is also—and this is the important fact—blindly and often unintelligently organized and conducted. What we need is, first of all, to realize, as Professor James and others have tried to make clear from the psychological side, that motor training is of great importance, and then we should go about the careful study of the numerous particular problems of method in this sphere.

The Root-Principle of Education.

By Ruric N. Roark, Professor of Pedagogy, State College of Kentucky.

IN the present inexact terminology of pedagogy the word "education" is used quite loosely. We speak of a man's getting an education or of his having an education as we would of his getting or having a farm. If there were a way to avoid it the term should never be thus used. because education is not a something to be possessed. One can *be educated,* but cannot have an education, because education is a process. As such it is continuous, and may be conscious or unconscious; it is oftenest partly the one and partly the other. It may also be progressive—upward and forward, or retrogressive—downward and backward. The process may be carefully and helpfully directed, as in the school, or it may be left to work itself out in the slums. The concern in this article is with the process of education as progressive and consciously modified and directed in the school-room.

Education, being a process, must be trued by the law of evolution. Its fundamental and radical principle must be sought where are found the governing principles of every other process of growth.

According to the pleasure-pain theory as worked out and formulated by Spencer and his school, the fundamental law of evolution is that the organism seeks the pleasure-giving and avoids the painful. Put in another form, this may read that the organism survives and develops best in an environment adjustment and reaction which result in pleasure to the organism.

If the newer theory of evolution, that the aim of effort is the realization of self, be critically examined, it will immediately merge into the pleasure-pain law, for, plainly, the realization of self is pleasurable and the non-realization is painful. This law is writ in our very members. A normal use of an organ is necessary to growth, to development, therefore such use is attended with pleasure. Inactivity of muscle, of nerve, of mind, is positively painful to any healthy organization, and if enforced becomes a cause of disease. The pleasure-pain law is the root-law of education, since, viewed from any side. education is an evolutionary process whose aim is the right realization of self, and education may be defined as "the process by which the individual is made capable of so modifying his environment and reacting to it as to attain the highest happiness."

The value of any principle is gauged by the fruitfulness of its application. Applying this test to the principle enunciated in the definition just given, it becomes plain in the first place that physical education—more insisted upon to-day than ever before—is manifestly worthless unless it makes the individual capable of the best use of his body, and the highest enjoyment, of necessity, attends and attests this best use.

The application of the principle is equally fruitful in intellectual education, or would be if we had the courage to apply it thoroughly. While it is too much to say, as some extreme Herbartians are reported as saying, that no child should be made to do in school what is unpleasant to him, it is not too much to say and to demand that all school work should be so directed as to evoke the hearty and happy effort of every normal child. The capital error of some Herbartians is in relying only on the immediate and evanescent interest of the pupils, instead of arousing their remoter and more permanent interests and making these mainsprings of vigorous effort. We must not forget that a boy enjoys being tired if the weariness is the result of successful doing.

The principle does not fail on the moral level. The right functioning of the ethical faculties is as promptly and conclusively attended and attested by enjoyment as is the functioning of a healthy body. Nor is there any contradiction of the principle by the other truth that the highest morality demands much sacrifice of self. It is only the lower self—rather should it be said the excrescences and abnormalities of self—that must be sacrificed in order to attain a lofty morality. And the end and aim of moral living, and therefore the end and aim of the education that fits for this moral living, is ethical enjoyment.

But the present ideal of education is not satisfied with the education of the individual merely as an individual. It demands that the boy and the girl be considered from the first as factors in the great social product; that they be so trained as to discharge the highest functions of citizens. It is in meeting this demand that the principle above given most clearly approves itself. No normal individual can attain the highest level of happiness except as a social being, whose life and effort shall add somewhat to the total of human good. The child must be educated to be a self-supporting citizen, one who can and will make an honest living, and who shall see that no harm comes to the republic. How educational possibilities come crowding in with that wider view! Here are to focus the energies of the makers of curricula, of the teachers in the ranks, of all who have to do with the problems of formal education.

The limits of this article permit space only to point out how, for example, the curriculum of the school has in a few courageous communities been modified in accordance with this root-principle of education. The kindergarten and present approved primary work are based on the vitalizing idea that the activities of the child are to be directed, not repressed, and so directed as to be socialized and to give the maximum of happiness not only to the individual but to his fellows as well. Manual training has been introduced into high schools and into the grades, in response to the conviction that most citizens in any community must make an honest living by hand and brain, rather than by brain alone, and that an incompetent, untrained, idle citizen can neither be happy himself nor add anything to the happiness of the community.

All that was best in the old disciplinary curriculum has been retained, and has had added to it much whose value is purely cultural, because we are coming to see more and more clearly that the disciplined and cultured mind has both an increased capacity to enjoy and an increased power to gain the things that make for the highest happiness.

We see with truer vision than ever before that the child has an inalienable right to the highest intellectual, æsthetic and ethical training, along with that which may make him a skilled laborer, or a prince of finance. And at the same time we are getting a firmer grasp of the fact that the real ethic to which always the intellectual and æsthetic must be made tributary is in the social relation.

The economical administration of the curriculum, the definite share of each grade of school in the great work of making individual character and happy citizenship, the methods to be used by the teacher, all these are problems for future solution and can be no-more than named here. Certain it is that the solutions, when arrived at, will be found to have started from the root-principle that the highest human happiness is the end and aim of human education.

Natural Education and the Education of the School.

By Samuel T. Dutton, Professor of School Administration, Teachers' College.

THAT nature is an effective teacher must always be admitted. The Creator placed man in an environment upon which he could react to his advantage., Nature's voices have ever spoken to him, pointing out the way of progress, warning, rebuking, encouraging, guiding him, while he has been climbing the weary ascent towards the supreme position which he now holds. The theory of evolution is simply a recognition of the potency of nature as the world's teacher and educator, and the universal assent which is given to this theory to day is a most emphatic commendation of her claims.

Prof. John M. Tyler, in his interesting work on "The Whence and the Whither of Man," traces his development from the lowest species of the animal kingdom in his several phases of body, intelligence and will, and shows how for countless ages a process, which we may as well call education, has been going on toward the final supremacy of those higher qualities which distinguished man from other animals. He clearly and vividly points out remarkable proofs of man's ascent, as found in his physical and mental characteristics, many of which are simply those of lower forms developed, trained and adapted to higher uses. More than any other biologist who has written on this subject, Prof. Tyler is able to see in the evolution of man an educational process which, since the dawn of creation, has been in operation and is still going on. He sees in nature a powerful school, organized with wonderful wisdom and conducted with consummate skill. Under the tutelage of nature, the higher functions and capacities of man have greatly taken precedence of the lower. *Mind* has become dominant. A spiritual nature has been developed and the power of intelligent choice, so that desire and aspiration are realized in faith, hope and happiness, and man has become conscious of fellowship with his Heavenly Father and of the power of the endless life. Henry Drummond, in his remarkable book on "The Ascent of Man," makes an additional contribution to the significance and educational value of this theory, especially on its ethical side. He pays much deference to the social and moral aspects of evolution, showing that it is not merely the struggle for life, but the struggle for the life of others that has given to the ascent of man its greatest importance. "From age to age," he says, "with immeasurable faith and patience, by cultivation continuously repeated, by transplantings endlessly varied, the unrecognizable germ of this new fruit was husbanded to its maturity and became the tree on which humanity, society and civilization were ultimately born." In two of the most impressive chapters on "The Evolution of a Mother" and "The Evolution of a Father," we have a broad sketch of nature's greatest work in training mankind for his mission of life and service. We have, both in the process itself and in the results achieved, subject matter for long and careful study, a study which would give us an enlarged and inspiring conception of the powerful instrumentalities which nature brings to bear in her work as educator. If we need any proof of this fact we have only to turn to the Scriptures, and here we find that far back in the shadowy past poets and philosophers looked to nature for lessons of quickening and guidance. "The heavens declare the glory of God;" "Day unto day uttereth speech and night unto night showeth knowledge;" "The heavens declare His righteousness and the people see His glory;" "But ask now the beasts and they shall teach thee, and the fowls of the air and they shall lead thee;" Go to the ant, thou sluggard; consider her ways and be wise." These, and numberless other passages, suggest the practical and ethical lessons of nature.

With growing intelligence came a tendency to social organization. Government, religion, and other forms of civilized life made their appearance in the world. At length came those institutions which embody the results of human experience and learning, and which express the moral and altruistic sentiments of communities and peoples. Are these fruits of progress to be credited to nature, or are they something apart? Are they rather the results of human effort and industry? Henry Drummond answers this question partially at least in his final chapter, entitled "Involution." He says that environment in its broadest sense is both the cause and the effect of Christian civilization. May we not safely say that the primary cause and source of all progress is found in nature herself, and that man is ever nature's child and displays to a large extent the power of her teaching. Are we not justified, therefore, in looking upon the institutional life of the modern world, with its altruism and self-sacrifice, as a reinforcement, which nature has summoned to her aid in order to complete and perfect the education of mankind? Is there anything in art, architecture or religion which is not rooted deeply in the heart of nature, so that we find it quite difficult to draw a line and say that this or that is due entirely to the wisdom of man?

Having in a general way brought before our minds the efficacy of nature as the world's teacher, let us undertake to answer two or three questions. Classing all the forces that educate under the general head of nature and her auxiliaries, omitting only the school, let us ask first, "To what extent do they fail in giving that efficient preparation for life which modern times demand?" Second, "What is demanded of the school as a supplement to the work performed by these other forces?" Finally, "What principles of education may be derived from nature which are absolutely essential in perfecting the art of teaching?"

We are sadly lacking in information as to the conditions in the primitive world. History does not tell us when schools began or what sort they were. We only know that as far back as history tells us anything there was an organized attempt to train the human mind and fit it for greater effectiveness. It is altogether probable that in the case of average persons there has never been any considerable progress in learning except through persevering efforts of parents and teachers. In ancient times, as at present, there were brilliant examples of self-taught people. In ancient Greece and Rome the few had the advantage of schools, while the masses were unschooled and were densely ignorant. If, occasionally, a slave rose above his kind, it was because through some favor he had the advantage of books and a teacher. Education outside of the home and the school has always been desultory and incomplete.

Nature teaches nothing thoroughly. She does not give the mental powers that persistent and systematic training which is needed to lift man above the ordinary and give him directive intelligence and executive power. The method of all real acquisition is through the senses, and here nature is most affluent, and from earliest infancy onward provides most liberally for the exercise of these powers. The external world seems to be exactly adapted to natural cravings, so that sensation and perception are continually going on; but nature's child sees inadequately and lacks power of consecutive attention. The school corrects this. It *selects* the most central and typical things, and secures from the child that exhaustive attention and studious observation which results in a cultivated power of perception, which is and ever has been essential to good, efficient work in the world.

Lack of systematic training in observation results in unsound judgment, hence nature fails in producing the *judicial mind* which can weigh evidence without prejudice and can decide justly and wisely. The school, on the other hand, is competent to correct this defect, for cultivated judgment is a logical sequence of the trained perception. To see accurately is to know and judge. If the school does not provide for this training of the perception and judgment, this gaining of knowledge at first hand and the former of conclusions, it is a poor school. Better is it to let the child fill his mind with the rich lessons of nature than to be stultified and deadened in a school which deals only with books.

Another respect in which nature is inadequate is in language. "Language, in its natural form," according to Hawthorne, "is little better than the croak and the cackle of fowls and other utterances of brute nature," but educated speech is something quite different, and this has never been reached except through systematic and formal culture. When Emerson said that "language is a city to the building of which every human being brought a stone," he should have added that only those stones were found useful which had been quarried and shaped by the skilled hand. The average boy or girl born in the slums, with no schooling, shows his deficiency in nothing more than in the language he uses. He has the vocabulary of the circle in which he lives and of the environment about him, and that is all. Thus has it ever been. The school, by giving an adequate knowledge of words, adds a new meaning to what the child has been and felt but could not express. The school which teaches words without things is poor enough, but the school which teaches things without words can hardly be conceived of. The power of cultivated speech, which the home and the school can give, is something which nature does not supply.

Hence, it follows that natural education has little to do with literature or history. Now, reading is the key which opens the treasures of the past, and here again it is only the highly endowed who learn to read adequately without a teacher. He who without schooling becomes proficient in literature is at once a celebrity like the learned blacksmith. Perhaps in no other field is the function of the school so much needed as in opening up to the human mind the experience and wisdom of the past, in training the young how to read and what to read, so that the whole life may be enriched and quickened by the example and achievements of those who have lived nobly and well, and may be kept in living contact with the movements of the present.

When we come to speak of the relative value of natural and artificial education as effecting the physical and manual powers, it would seem at first as though the school had little to offer, and were we dealing with life in rural surroundings there would be less to be said in favor of the school; but with the growth of urban communities and the impossibility of providing for the young free exercise and industrial training of a natural sort, it becomes necessary to invoke the aid of the school in order to secure healthy bodies and a proper cultivation of the manual powers. The sports and gymnastics of the school and the college to-day, as well as manual training, are simply a remedy for that defective condition resulting from life in the town and the city.

In the realm of moral training we have also to look to the home and the school. Nature is not immoral but she is often unmoral and does not provide those checks and restraints upon human desire which tend to bridge over those dangerous places in life which cause the destruction of so many. The school permits, and should insure, a kind of social life that is ideal. Self-restraint, self-government, may be operative in such a way as to promote ethical culture. The school furnishes opportunities for courtesy, industry and patience. It stimulates manly pride, curbs conceit and develops public spirit. All these things are in a certain sense in the order of nature, but nature herself does not teach these lessons. They are reached by a long, sustained training, and for their highest fruition call for the cooperation of the home and the school.

Thus it will be seen, that while nature in her educative work has powerful agencies at hand, she only carries on the process to a certain point. The seed which the farmer plants in the earth depends largely for its successful growth and maturity upon natural forces, as the soil, the sunshine and rain, but unless the farmer does his part, properly preparing the soil, fertilizing, destroying the weeds and caring for the growing plants, the harvest is likely to fail. Thus it is with the human organism. Nature does much. She throws around her pupils an environment perfectly adapted to their general growth and welfare, but parents and teachers are necessary to see that other conditions are favorable, and to so direct and guide the learning process that it results in the highest efficiency. We might find many illustrations of the universal truth that nature furnishes the raw material, which man must take and shape to practical uses. Of what value would steam and electricity be unless the genius of man had conquered them and, by almost infinite skill, made them subservient to his will?

After what has been said it may seem paradoxical to suggest that the greatest failure of the modern school lies in its neglect to keep in mind the methods of nature, but such I believe to be a fact. However short nature may come of furnishing complete culture, her methods are of all others the most excellent. They show infinite wisdom and adaptation. The great danger to the school is that it may become too artificial and may violate those natural laws which determine the health of body and mind and spirit.

Let me, therefore, call attention to a few of the fundamental ideas illustrated by natural education. First, all nature's teaching is real. The mind deals with things and not with abstract ideas. A little child out of doors is always at school in an excellent sense. The earth, the green grass, the trees, the birds and the insects all fill him with delight, and his mind is stored with impressions which tend to nurture his mental life. Too often the school separates the child from this world of life and beauty. The blank walls of the school-room and books, however good they may be and however kind the teacher, are poor substitutes for the healthful glow and unfaltering interest which the child finds in the field and by the roadside. Is it a wonder that a child plays truant sometimes? The problem of the school at the present time is not so much to bring natural things into the school, or even to take the children out to nature, although I believe this to be a most essential part of school life, but it is rather how to make all teaching real, how to connect the child's interest and experience with what is going on about him, so that he lives in a real world, uses no words which are meaningless and so finds interest at every step. This claim of natural education has been urged by the greatest teachers for many centuries, and should ever be kept in mind by those who desire to make their art conform to natural laws.

The second fundamental lesson to be borrowed from nature is that children are endowed with the instinct of play, so that sport should have a large place in the school program. Play is bred in the nature of all animals, and children are no exception. Romaines, in his facinating work on animal intelligence, states that even ants, who, as we have seen, receive honorable mention in the scriptures for their industry, have time also far recreation when they indulge in a variety of sports. The same author speaks of the play of different fishes and birds, as well as of those domestic animals with which we are all familiar. Surely all nature thrills with a tendency to joy and happiness and sport, and there can be no healthful, normal school life for young children that does not recognize this fundamental truth. A wise, judicious teacher will find some way of having her children laugh without impairing the value of their school work. He will discover means by which the play instinct can be utilized in working out the more serious tasks of the school-room.

Again, in nature's school, curiosity and interest are ever kept alive. Whether it be the child or the adult, the external world in its variety of form, its changeableness, and in the interesting problems presented, keeps the mind ever alert and active. He who has no question to ask about what he sees around him and takes no interest in the same, is losing his hold on life. The healthy traveler finds his greatest fascination, not in cities and works of art, but in the infinite grandeur of the ocean, the perennial beauty of the landscape, its charming valleys and majestic mountains.

Nature raises many questions which she does not answer. It is the function of the school to so direct child life not only that these questions may be asked, but that the pupils, as far as possible, by their own investigations may find satisfactory answers. The fact that nature keeps a great many questions open and holds the mind attentive and active is a pregnant suggestion to all teachers not to tell too much or to be eager to have questions settled.

Education, according to nature, is secured, moreover, by personal experience. Joseph Paine, in a chapter on "Principles of Natural Education," lays much emphasis upon this idea. "The learner," he says, "educates himself by his personal experience, that is, by the direct contact of his mind at first hand with the matter to be learned." "Personal experience is the condition of development, whether of the body, the mind, or the moral sense." "What the child does himself and loves to do forms his habits of doing, but the natural educator, by the power and promotion of this exercise, also guides him in the formation of right habits." Here we see that man is a part of nature and that he has been evolved, developed and disciplined by processes and methods of her own. Nature never hurries and does not permit over-pressure. Here, also, is a hint for the school. Parents as well as teachers need to dread that precocity which is the result of a too rapid growth of the young powers, and which too often leads to arrested development. Time forbids the mention of other suggestions to be drawn from nature's methods.

Briefly summarizing, we see the educational service which nature has rendered in the evolution of man. We have seen, also, that man's art is needed to give to education its highest practical and ethical value. Nature, unaided, does not build houses or paint pictures. She furnishes the materials and offers many rich and fruitful suggestions, but it is reserved to man to embody them in works of utility and beauty. So it is with instruction and training; she furnishes the best materials and provides many hints as to method, but the parent and the teacher, recognizing the value of her teaching, bring their skill to bear in striving to produce the ideal man and the ideal woman.

Let us remember, therefore, that the art of teaching, like all art, finds its sustenance and inspiration in nature. In support of this truth, I will quote, in closing, from Longfellow's Hyperion:

"Art is the revelation of man; and not merely that, but likewise the revelation of nature speaking through man. Art pre-exists in nature and nature is reproduced in art. As the vapors from the ocean, floating landward, are dissolved in rain and are carried back in rivers to the ocean, so thoughts and semblance of things that fall upon the soul of man in showers flow out again in living streams of art and lose themselves in the great ocean which is nature. Art and nature are not, then, discordant, but are ever harmoniously working in each other."

The Sociological and Anthropological Factors.

By Richard G. Boone, Superintendent of Schools, Cincinnati, Ohio.

I.

FOR the observation of the process that is called education there are three points of view. One regards the child as an individual, living a somewhat independent life, distinct from his fellows, with his own peculiar tastes and preferences and limitations and capacities, and entitled to consideration as an individual. Education in this sense means the unfolding and coming to maturity of such powers as the individual possesses; school education is the proper direction of this development. Teaching consults the individual bias and aptitudes. The child is encouraged to do what he can do; not what he can do best only, but whatever he discovers the ability to do profitably. He is taught nothing for the sake of information. His personal needs determine the selection of lessons —both in amount and kind. The demand for individual teaching is incident to this view. Elective courses of study are a recognition of the right of the student to pursue studies suited to his mental bias and preferences. In consonance with such doctrine it is held that the child's maturity and spiritual need at the moment must determine every lesson. The future he must lead will be properly and adequately prepared for by doing the best thing for his present. In all of which statements there is implied a faith in the doctrine that the training that is best for the child now—really best for his soul's present needs—is also the training that his future demands; and, moreover, the education that is best for the pupil who is to continue in the school work is likewise best for him who must close his school connections.

It is not at all the purpose of the present paper or of the present series of papers, to discuss the validity of this claim. The existence of this view is cited merely to refer it to that notion of education that emphasizes the process of individual development. The notion has its place and a legitimate meaning. No other view can justify ignoring this. It is entitled to recognition and must not be lost sight of in reading the following paragraphs.

From the second point of view for the observation of the educative process, the child is regarded as more, or something other than an individual. There is here a recognition of the element of association and the community relation as a factor in the individual life. The individual finds his work and his interests opening out into lines that concern others not less than himself. While still personal, they are also social.

The child is to be taught not as an individual only, but as one of many. Most of his interests, and certain of the most important ones of his life are shared by others, not from his own choice but through necessity. Few of all the varied experiences of any day are of merely individual meaning or consequence. What one thinks or wishes, what he suffers or enjoys or attempts, his sense of freedom or restraint, his purposes and achievements and failures, all have social implications, sometimes a social origin, always a neighborhood or larger social or racial effect.

How the individual should live, and how he may be given the disposition to live, and know how daily to live, in the mass, among people having conflicting and heterogenous interests, as a member of various and unlike and often mutually encroaching organizations —one of the family, a neighbor, a member of the church, a citizen, a reliable and productive force in industrial society, interested in the great culture movements of his race and his generation, and a factor in their furthering; while still preserving his manliness and personal integrity and self-respect, and conserving his personal happiness,—these are the questions of the school. These have always been the questions which serious minded people have been asking among themselves and of others. Sometimes by the far-seeing, or by those more bold than others, there has been a vague hint that the school should answer them. And why should it not answer them?

As connected with the present discussion further, education has to do with the individual and with each generation as one in a genealogical series. The child is what he is because the generations before him were what they were. How they lived and how they strove to live fixes limits and reaches to his own life. The achievements of the past also are a part of his environment. The accumulations of culture in the race, and skill, and virtue, and interest, are tools for his maturing. A rich life behind him makes easier a rich life within him. Paucity there means struggle here. No educational doctrine is either adequate or safe that leaves out of account the race connections and responsibilities of the individual or the generation, and their bearing upon education, and especially upon school education.

Summarizing what has been said, there are the three aspects of education, as follows:

(1) The education of the individual as an individual, emphasizing development.

(2) The education of the individual as one of many, together making up the contemporary generation, and emphasizing training and the process of social adjustment.

(3) The education of the individual as a link in the genealogical chain, emphasizing evolution.

The first is the technical view, the second practical, and the third philosophic. Preparation for the first comes through psychology, for the second through sociology, for the third through history. The first is individual, the second social, the third institutional. The first appeals to the teacher, the second to the man of affairs, the third to the statesman or philanthropist. Under the influence of the first conception, conventional prescription is reduced to a minimum. Only the learner's need, his spiritual need at the time is determining. Under the second, the existing and prospective community life gives direction to the learning exercises. Under the last, culture is held to be the convergence in each individual and in his generation of the race's typical thought and achievement.

This series of papers is concerned primarily with the second of these modes of interpreting education, that the existing institutions and the manifold social groups are themselves determining influences giving shape and character to the individual life, and that all directed education should have for one of its purposes to fit the individual to use and enjoy and improve the social environment—to live among and with his fellows, co-operatively and fruitfully, to his and their advantage. Should not the school contribute to this result?

The passing pedagogy, under the influence of the scientific spirit of the age, undertakes to say, not only that there is such cause and conditioning relation between the culture and character equipments of the individual and the integrity and purity and adequacy of the institutional life of his time and his people, but that the conception becomes an organic part of the educational doctrine that must be held to fix the school practice of the future.

The distinctively human interests of man take form in the institutions. These social institutions for present purposes may be classed as (1) the family, (2) civil society, (3) the church, (4) the state, (5) organized industry, and (6) the school. In the evolution of these institutions there has been developed for each a more or less elaborate code or ceremonial fixing the relations of the individual to his fellow-members, through the erection of certain consistent standards. One function of directed education is to fit the individual for intelligent participation with his fellows in these several institutions under these codes. Civil, social, moral, religious, political and industrial codes abound and multiply. The simplest life becomes intricate if population increases. Better that one live ignorant of much learning of the books, if he be resourceful in finding his own and the Samaritan's way in this labyrinth in social obligation and privilege. The conviction grows that the school or other formal education of each one should fit him to share the comforts and enjoyments, and give him ability and the disposition to assume a full portion of the responsibilities and burdens incident to this common life.

In another sense also every effort at education must take account of the influence exerted by each institution toward the education of the individual. For the earlier years of childhood the family is the chief factor in training; following that comes companionship; then the school; later one's industrial occupation; in time the church and the state. In a very positive sense, what the school or other positive instruction can do for the child depends upon what these other agencies have done and are doing for him. The home life, companionships, non-school reading, leisure hours and other employment, social conventions, labor, the church and its missions, and civil enactments and administrations; all make their respective contributions to the culture and training of each one. Every lesson of the school has need to regard the earlier or accompanying lessons from these extra-school conditions.

These extra-school institutional and community relations every teacher has need to know well. Here are implied or explicitly stated questions of education in its relation to crime, to public and private comfort and common thrift, and civic integrity, and the dependent classes, and popular amusements and the social life generally. In the study for the teacher there are comprised investigations into aggregations of population—city and rural conditions, and the incident cultures; the co-operation and antagonism of social forces and interests; the community character and conditions of its improvement; social classes, their meaning and dependencies; the social mind and its evolution; human traits and their refining; voluntary and other group associations; and the incident or ideal social progress. How the individual stands in relation to the social group, influences it and is influenced by it, is a vital factor in all educational movements.

But these are all questions of sociology rather than psychology. The process of equipping teachers for their work must include an insight into the nature and conditions of life in the mass and in the midst of societies, not less than an acquaintance with the individual child or the average child or any child. It means a close and intelligent acquaintance with the literature of one's time, its art and invention and industry, its institutions and social forces, the ethical, religious, and other moral standards, the æsthetic standards and appreciations, political and civic relations, and the conditions of neighborhood intercourse and mutual influence. The thought of the paper is that the science of education to be, must include greater emphasis of this sociological factor.

By way of recapitulation in the following points are cited as the doctrine of the paper:

(1) There is an education of the individual as an individual.

(2) There is an education of the individual as a member of a group.

(3) There is an education of the individual as both a product and a factor in the evolution of the race.

(4) This series of papers was projected to call attention to the educative influence of the several social organizations and the common social life in the growth of the individual.

(5) It makes note also of the reactions of the individual life upon the institutions, social groups, and other individuals as constituting one of the legitimate meanings of education.

(6) The permanent forms in which the distinctively human interests appear are the six great institutions named above, each of which is a means of education, and makes its peculiar contribution to every one's training.

(7) Many of the vital questions of education are also social questions.

(8) Equally most of the great social questions are at the same time, fundamentally, questions of education.

(9) Teachers have need to understand both orders of relations, and to make the knowledge effective in their teaching.

II.

THE ANTHROPOLOGICAL FACTOR.[1]

Every thesis in the former chapter, "Sociology for Teachers," would lend itself to an elaborate treatment in the development of a science of education. Of the three aspects of education there enumerated, the first, the education of the individual as an individual, was disregarded. This is the more common and technical view. It rests upon psychology and concerns the individual. This is the view that attracts the teacher and gives excuse for recipe and formulæ. It regards development and makes little of social and economic adaptations.

The first chapter was given to a consideration of the second of the three aspects: the education of the individual as one of many, together making up the contemporary generation and emphasizing training and the process of social adjustment. Everyone is more or less influenced by this manifold of his social relations. This human environment, his larger self on the personal side, becomes his teacher. No one escapes it. It is ever present, insistent and insinuating. The schools accomplish nothing by ignoring it, and but little through opposition. In another sense, also, the teacher is concerned to understand this relation. The child must be fitted not only to receive helpfully society's influences, but resourcefully to assume his share of responsibility for the furtherance of society's interests. Both facts very greatly modify the work and aims of the school. When teachers better appreciate the objects and virtues of an education, they become less tenacious of set methods and devices, and exalt the life over any mere forms of learning.

As furnishing a ground of comparison, this chapter sets forth the third of the three aspects to which reference has been made: the education of the individual as a link in the genealogical chain, emphasizing evolution. The individual is not only one of many making up the whole of his generation, he and his generation are one in a series of individuals and generations running back through the years and centuries. Everyone's present is connected with a past that antedates his past, which conditions his present and upon which his future must be built. The line of each one's life is an unbroken series from the beginning. The line of each community's life also reaches well back into a determining past. To understand an existing institution one must know the conditions out of which it grew. To comprehend prevalent customs and social forms the student will have need to trace them to the cruder conventions out of which they grew and explain their origin. The school is an enigma, or a meaningless excrescence upon modern society, until one has the eye to see and the mind to interpret the social and economic and personal urgencies of a struggling race that have discovered and developed it. This remark applies equally to all the functions of the school and to school devices. Courses of study and school systems, educational and pedagogical doctrine, codes of laws and instruction, methods and devices, school-room policies, administrative and prudential standards, professional codes, the training of teachers and the purposes of teaching—all are understood only as their origins are understood and the conditions of their becoming.

All of this is only another way of saying that a fundamental requirement of the teacher is that he master the evolution of his profession. The method of study in education is the method of study in all of the social sciences—the historical method of unfolding. Every teacher should be an expert in applying the principle of evolution. Concerning the concepts mentioned above and similar concepts touching his profession, he should not lose for once even in his reflections upon his work the consciousness of this unfolding of processes and powers. All study in pedagogics or education is a study of origins and development, of selection and survival through the influence of favorable and unfavorable conditions, of competing forces and interests, of varying opportunities, of improvement and decay, in accord with the general law of evolution. The teacher has need to comprehend both the principle and the process as applied to human conditions and human interests and human improvement.

In all the history of mankind nothing is more interesting or more striking than the making of the scholar and the doer; the evolution of the man of civilization; this wresting from coarse and savage nature the gentleman, the tender heart and polished mind, considerate, temperate, unselfish, far-seeing, resourceful, self-initiating, companionable humankind. That the law of his making in the mass is the law of his making in the particular is a part of the pedagogical creed daily growing in acceptance. Teachers believe in it in theory, but violate its spirit in daily practice. They talk of education as development, and teach as if it were accumulation. They affirm education to be a natural process and straightway set to work as if it were artificial. In their zeal they forget that education starts from within and not from without, and that the teacher is only the child's environment in another form. All education is a process of child emancipation, in which the wise, far-seeing teacher is able to render valuable assistance. This study which has to do with man's dependence upon and his gradual emancipation from nature is known as anthropology. The process represents various grades of struggle, now physical, now spiritual; here aimless and thing-like, there purposeful and prescient; but always more or less competitive, in places advancing, elsewhere retrograding; with powers sometimes coarsened while invigorated, again tempered and weakened; in time both refined and strengthened, the fittest to be, in the end, selected and preserved. Who can doubt that in the final analysis this expresses the latest century's maturest judgment of the divine plan?

It is an interesting study, full of suggestion to any one, but especially to teachers—this natural history of man and the rise of human interests and their final setting in the social institutions. In the origin and rise of clothes and the manual arts, the development of skill and its accompanying invention, tools, implements, instruments and furnishings; the transformation of luxuries into necessities and inconvenience into comfort; the development of means of travel and transportation, the assumption of new occupations from nut and fruit gathering, hunting and fishing, through the more difficult grazing stage, with its accompanying domestication of certain of the hitherto wild animals, the more settled farming life, the stage of manufacture, with its manifold degrees of skill and the division of labor, to the complex forms of barter and trade in modern commerce, and the somewhat artificial life of the professions; the way is, while long, neither devious nor inexplicable, and is full of meaning to those who have the direction of the rose's further culture. Here also are to be studied the rise and incentive to the fine arts; the rise and sanction of amusements, customs, personal deportment; social life and codes, the standards of social classing, slavery and its concomitants; the advantages of a wild life, the evils and virtues of civilization; stages and forms of intellectual and moral life, primitive innocence and barbarities; the comparative stolidness of the savage, the alertness of civilized minds; forms of worship and codes of virtue. What can constitute a more promising course of training for the teacher than a series of readings and laboratory investigations into these and similar experiences of the race? Here is the natural history of man's maturing. This is civilization in the making. What has happened to the race in these and kindred ways the school seeks to bring about and further consciously and to wholesome ends. In the attempt how must the unwitting teacher blunder and hinder! The one great hurt, in the effort to teach, is an all-pervading ignorance of, often an indifference to, the knowledge which promises most to make clear the ways of learning, and hence the ways of teaching. Among the helpful sciences for the teacher is believed to be this which deals with the race's domestication and civilization.

Here are considered questions of the bodily and other physical influences upon man and the interests of mankind. Climate, seasons, food, dress, exercise, leisure, sleep, and bodily conditions generally, are determining factors in a race's or nation's education. They may not safely be ignored in the treatment of the individual.

The fact and conditions of heredity are familiar factors in all education.

Race characteristics and differences are of peculiar significance among a heterogeneous people. The teleological and superstitious qualities of the unthinking races, the early arrest of development of the more primitive groups, the early love of the ornamental, the slow development of temperance and moderation, the absence of thrift and order, repeat themselves in varying degrees as conditions approach the primitive life, in every age, and demand corresponding treatment. To Americans, with a vast negro population, with thousands of Indians as wards, and with a large immigrant class, the question becomes doubly important.

Among all the class relations, the most marked, and, because an anthropological fact, the most organic, is that of sex, with its pedagogical and other social implications.

Age also is an anthropological fact that is a determining factor in all education.

The discussion of both of these must be omitted, as they may *safely* be omitted, in the present series. The elaborate consideration of the questions incident to the general topic was not contemplated in the first place, but only a careful presentation of them; and besides, of all the factors belonging to this class, these two—sex and age—are perhaps best understood.

Education as World-Building.*

BY THOMAS DAVIDSON, Author.

IN dealing with the question of education the three important questions are: (1) What is the being to be educated? (2) Wherein does education consist? (3) What is the result aimed at in education? We may deal with these in their order.

1. What is the being to be educated? or what is the human subject or soul? Various answers have been given to this question by mythology and metaphysics. We have been told that it is a divine breath, a fallen angel, an idea, a pure form, and so on. But if we leave these obsolete sciences aside, and ask what we know the soul to be, resolved to be content with that, we come to a very different result. And here each of us has the advantage of being, for once, behind the scenes. Each has only to ask himself, What do I know myself to be? And if he answer honestly he will, I think, say: "I am a feeling, or sensibility, modified in innumerable ways, by influences which I do not originate. These modifications, when grouped, are what I call the world, or *my* world, for I know no other. I am the sentient unity of a sensible world."

2. Wherein does education consist? We have seen that the permanent feeling, which I am, is modified in manifold ways, and that these modifications, when grouped and articulated, are what I call my world. But the question is, Why and how do we group our sensations, and then transform them into a world of things? This brings out the fact that there is, in the feeling which I am, an element not yet described, an element which reacts upon sensation, and is, therefore, active. This we may call desire. It is an effort after satisfaction, that is, the largest possible amount and variety of feeling. But such amount and variety are possible only when feelings are grouped, so as to be easily surveyable and graspable. Ease in grasping we call pleasure, difficulty in grasping, pain. In grouping our feelings, therefore, we are merely seeking pleasure and shunning pain. Moreover, in placing permanent hypothetical essences behind groups of sensation, we are merely determining for future use sources of satisfaction. Next comes the question, How do we create the world? The answer, By association or grouping. Sensations that are similar we put together and name with an adjective; different sensations that repeatedly come together we unite by means of an essence, and name with a noun. In this way we obtain an adjective world and a noun world, or, as we sometimes say, an

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* Extracts from an address prepared for delivery.

abstract world and a concrete world; and conscious experience consists of judgment, in which elements of the former are identified with aspects of the latter, *e. g.*, the horse is white. When we think that the abstract is derived from the concrete, we think the exact opposite of the truth; the concrete is built up out of abstract by grouping and hypostasizing.

3. What is the result aimed at in education? That the human being will, under any circumstances, build up some kind of a world is clear. To a large extent he does so unconsciously, and without any effort. But there are worlds and worlds. The world of the street waif who picks pockets and goes to the reformatory or jail is very different from the world of the great scientist, artist, philosopher, or statesman. The former can be built up without any education, the latter cannot. The former affords few, small, and brief satisfactions; the latter many, great, and permanent ones. Since the human being is a sentient desire, which from its very nature demands the highest and most varied satisfaction, the aim of education must be to enable him to construct a world capable of yielding such satisfaction. At first sight this may seem a very selfish, almost sordid, view of the world and of life as conditioned by it, but when properly understood enjoyment, or satisfaction, of some sort must be the end of every desire, such as the sentient soul is. And this brings me to my first thesis:

A. *The aim of all education, as of all life, is the evolution of the social individual in knowledge, sympathy, and will.*

If this and what has been said above be both true, it follows that man finds his highest satisfaction in knowledge, sympathy, and will, and that he does so as a social individual. This must now be shown by a further analysis of human nature.

The human soul, as we have seen, is originally a sentient desire, or a desiderant feeling, which through experience gradually differentiates and articulates itself into a world. In the course of this process the sentient aspect of the soul gradually organizes itself into intelligence, while the desiderant, or conative, aspect, co-ordinated with intelligence, becomes will. This process is never complete, so that there always remains in the soul a certain residuum of unintelligent, unvolitional (instinctive) desire, which we nowadays distinguish into passions, appetites, and emotions, but which may properly be called sympathy, or love. This must be made rational, without ceasing to be instinctive. In this developed condition the human soul is a tri-unity of intelligence, sympathy, and will, standing in a threefold relation to its world. As intelligence, it knows and learns, that is, widens its world; as sympathy, it clings to certain known objects and tries to increase their number; as will, it makes such changes in its world as shall render it more satisfactory, that is, more knowable and more lovable. Let us here observe that every change in the soul means a change in its world. Increase of knowledge is increase of world; increase of sympathy is increase of lovable objects, or of aspects in objects already loved; increase of will is increase of changes in the world.

If, now, the soul from its very nature demands the highest satisfaction, this must mean, for the developed soul, satisfaction of intelligence, of sympathy, and of will; and education must mean instruction and practice in the method of reaching such threefold satisfaction. Moreover, since the most important part of the world of each individual soul is a society of souls assumed to be like itself, and since its satisfaction is entirely dependent upon its world, it follows that it is only as a social being that any soul can find the highest satisfaction, or requires education. It is needless to add that, since all education is education for life, life and education have the same end.

My second thesis, following directly from my first, is that:

B. *The evolution of the individual is the evolution of an ordered world in his consciousness.*

If this is true, the aim of education must be the evolution of such a world: education is world-building.

The extent and richness of the world which any living thing constructs depends upon two conditions, its capacity for manifold experience, and its power of arranging or classifying that experience. The former of these, again, depends upon the number and acuteness of the senses; the latter, upon the force of the primitive desire for satisfaction. If the products of the senses are few and similar, the world will consist of few elements; if the organizing desire is feeble, the products will remain unclassified and, again, give a meager world, because no soul can grasp many elements without classifying them. We may say, then, that the evolution stage of any being is determined by the extent and complexity of its world, which, again, depend upon its power of organizing a large experience. It follows directly that education is instructive in world-building, that is, in acquiring a manifold experience and in organizing the same.

The important point to note is, that each individual in building his world has to reckon with other worlds and other world-builders, and these, too, of all grades. We have all to reckon, not only with the worlds of our fellow-men, but also with those of mosquitoes, microbes and plants. It is this necessity of reckoning that makes us social and moral individuals, that supplies us with a norm of action, and prevents us from being capricious.

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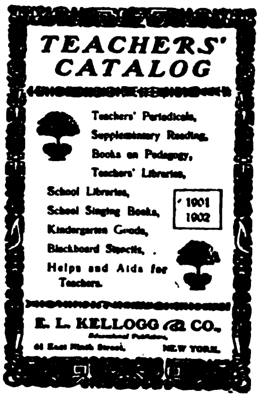

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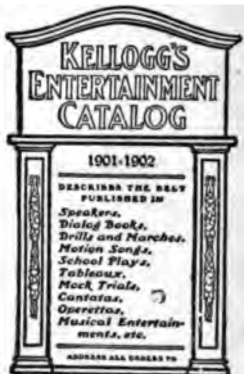

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